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LECTURES
ON
COMPARATIVE ANATOMY
AND
ANIMAL PHYSIOLOGY,

DELIVERED BY

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LECTURE VI.

ON THE ORGANS OF SUPPORT OF ACALEPHA AND ECHINODERMA.

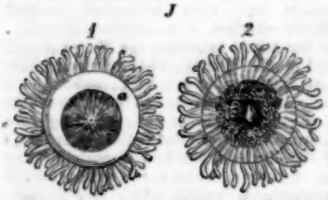
GENTLEMEN,—The next class of animals, the skeletons of which we have to examine, is that denominated *acalepha*. There are but few parts in this class of animals which we can consider as analogous to a skeleton; indeed, the skeleton in a solid state, consolidated by the carbonate of lime, scarcely occurs in more than two genera of acalepha. In the *velella* (*K*) and *porpita* (*J*) we have examples, in this class, of animals with thin flexible calcareous skeletons. The greater number of them, as the physalia, beröe, and the various forms of the medusæ, have scarcely any hard substance of this kind beyond a cartilaginous substance, which is placed generally in the form of curved columns round the entrance of the stomach. In the beröe, in the equorea, and in many of the minutest forms of the acalepha, you could scarcely consider any part as analogous to a skeleton. These are those small gelatinous bodies that you see sometimes in the Thames, near Sheppy, so abundant in the water as to change its colour—they are part of the little animals which give the chief luminosity to the sea, and which you find so abundant in it, that hundreds of miles have been traversed, illuminated by them in one continuous line. Capt. SCORESBY counted 100,000 of them in a cubic foot of water. In the Arctic seas they are the principal food of the Whales. These little animals have nothing that can be considered as a skeleton—no particle of the carbonate or of the phosphate of lime entering into their composition. But in the larger forms of the medusæ, you find disposed around the circular part and lower centre, curved cartilaginous bands, which give support to the appendices that hang down from the centre of the lower part of the mantle. They are the fixed points by which the contractions of the mantle are directed to the lower centre—by which movements the medusæ swim through the sea. They have no particular organs of motion different from the general convex fleshy mantle which covers all the other parts of their body. When you find those medusæ bleaching on the sea-shores in the air, and in the summer's sun, on all parts of our coast, in incalculable myriads, you will find that the last part to dissolve away is this firm transparent cartilaginous texture around the mouth, forming the thickest part of the dried disc, which is left exposed by the evaporation of the liquid parts, the cellular texture remaining behind, which also soon disappears, and no trace of these soft stinging animals is at length to be perceived on the shores where they were strewed in thousands.

Now, although there are no parts of this density in the smaller and softer forms of acalepha which I have mentioned, there are some of those animals which have cilia for progressive motion; they are the *ciliogrades* of Professor BLAINVILLE, and their cilia are always attached to a firmer portion of the general cellular substance composing the greater part of their body.

I had occasion to allude to this small ciliograde animal the *beröe* before, when speaking of the attachments of cilia in animalcules. We find in it eight longitudinal bands extending from the mouth in the centre below, upwards to near the

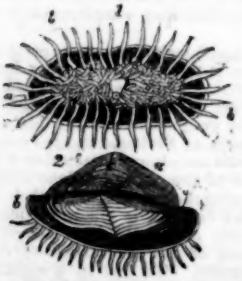
anus, which is diagonally opposite the mouth. These bands are of greater opacity, of a firmer texture, and are the parts upon which the vibratile cilia are disposed, serving thus as a support for the organs of progressive motion, and being, apparently, the firmest parts of the cellular texture of the body. These parts, though soft, may, in some manner, be looked upon as an elementary skeleton, like the corresponding parts in animalcules. The cilia of beröe are formed with rays like the fins of a fish, and are analogous to the feet of echinida.

J



The calcareous skeleton of the small group I have mentioned, comprehending the *porpita* (*J*) and the *velella* (*K*), exists in the lower part of the mantle, which is the circular transparent disc (*K* 1, *a*) covering the upper part of the porpita. The porpita is like a velella, without its perpendicular crest (*K* 2, *a*). You will see here a firm, cellular, white, porous, calcareous disc, and this agrees with the skeletons of many of the zoophytes. In the reteporæ, in the escharæ, flustræ, celleporæ, and many similar genera, we find a similar cellular or reticulate structure of the skeleton; we find it here in the porpita from the Indian seas. In the velella limbosa we find the skeleton, though transparent, consolidated by earthy matter, and serving as a solid framework for the protection and support of the soft parts.

K



The skeleton of the *velella* consists chiefly of two plates, the lower one, of an oblong form, is disposed horizontally (*K* 2, *b*), as you will observe by these numerous specimens, which I collected last year on the coast of Cornwall. The lower one, of an oblong and concavé form, is placed horizontally, and consists of several thin plates (*K* 2, *c*), disposed upon each other like the layers of a shell. From the concave centre of the lowest part of this plate (*K* 1), hangs down the circular tubular mouth of the velella. Around the mouth are disposed numerous small tubular suckers, resembling the feet of many radiated animals. Around the edge of this oblong plate hangs down the margin of the gelatinous blue-coloured mantle (*K* 1, *a*). Arising from the upper surface of this plate, and traversing obliquely its centre, there is a perpendicular very thin crescentic plate (*K* 2, *a*) in the *velella*, which you observe in all the specimens that are before you, obtained both from the British and from the Indian seas. These plates, as you will perceive by looking through them, are distinctly composed of layers deposited by the gelatinous mantle, the curved margins of which layers are very visible (*K* 2, *c*). The skeletons appear to be extra-vascular and unorganised, although in the central part of the body, and completely surrounded by the fleshy substance, like the extra-vascular and unorganised corals which we were considering yesterday, and their softness and delicacy correspond with the softness and mobility of the embedding fleshy substance.

The skeleton of the next class of animals, the *echinoderma*, presents much more variety in its form, its consistence, and its nature, than the class *acalepha*. In some of the animals which we still place among the echinoderma, there is no solid part on the surface, and scarcely a trace of any kind, internally, of a skeleton. This may be stated of the actinia, of the siponculus, and several other forms of the echinoderma. We observe, however, that the actinia, or common sea-anemone, though it possesses no skeleton or solid part externally or internally, is still covered with a very dense, irritable, coriaceous integument, which protects all the delicate organization within. Many of the species protect themselves further, by causing to adhere to their surface, by minute suckers disposed on their surface, particles of shells, particles of sand, gravel, and other heterogeneous substances. This extraneous covering which they cause firmly to adhere to their surface, as you can observe by attempting to tear one of these fragments from the animals, serves not only to protect them, but to conceal them; for being thus covered, you can scarcely distinguish them from the sand

or gravel or shelly bodies among which they are placed. This is a mode of protecting the soft parts which we shall find abundantly illustrated and extended as we proceed through other classes of animals not gifted with a power of secreting for themselves, by their own vital energies, a skeleton of any kind, yet having instincts and apparatus for collecting foreign matter around them, and forming shields of various kinds. Worms, whose skeleton is still soft, we shall soon see form to themselves tubes of sand and shells, and various extraneous substances. There is an example of the same thing in the actinia—the common sea-anemone—but its tough, irritable, coriaceous integument is the part which is analogous to the more solid skeletons of most of the species of echinoderma.

Now in the family of the holothurida, the surface of the body is covered with the same coriaceous, tough, contractile integument, as that of the actinia. This is the case also with the siponculus, and most of the soft echinodermatous animals. But in the holothurida (or animals resembling the holothuria), although there is no central solid skeleton supporting the body, there are solid internal parts which serve for the attachment of muscles. There are solid parts in the holothurida, as you see exhibited in the dissected specimens of the holothurida before you. They form a circle of five pairs of moveable pieces, disposed, like the alveoli and teeth of the echinus (*L* 3) and cidaris, around the mouth. These five pairs of hard calcareous pieces, the only hard parts of this animal's body, resemble, in their general form, in their position, in the manner in which they are connected together, and with the muscles of the mouth, the complicated apparatus of teeth and alveoli which we find in the common echinus (*L*), and in the cidaris. Their composition and mode of growth are the same. They give a solid attachment to the muscles of the mouth, and they probably serve to subdivide the food of this highly-organised animal.

The holothurida, like the echinoderma, which have teeth, may be ascertained, by the contents of its stomach and intestine, to feed upon the minuter testaceous and crustaceous animals. This is apparent from the considerable quantities of shells and sand and particles of gravel which you see filling the intestine in these dissected specimens. The solid parts surrounding the mouth of the holothurida serve also for the attachment of the longitudinal muscular bands of the body, and support the long ramified tentacula which are extended around the mouth of the animals, and which can be forcibly contracted and entirely concealed within the body.

In considering the skeletons of the zoophytes—the *polypiferous* animals—we saw that the greater number of them were fixed to a point for life, and that the animals could not swim to and fro in search of their food in the sea. This appears to have been also the case with vast tribes of the echinoderma, which have once inhabited our seas in incalculable numbers. The immense family of echinoderma denominated *crinoidea*, was composed of fixed animals of this kind, and which were closely allied to the euryale, comatula, ophiura, and many others, which at present inhabit our own seas, but they differed from all those in being fixed by a peduncle to the solid rock, growing up by a stem, and ramifying, and the ramified portion having much of the organization of the comatula and euryale. We see that those animals have adhered to the rock, by finding, in a fossil state, many remnants still adhering by an expanded circular disc; the first or lowest ring formed adhering to the rock from which they originally extended their body, like the existing pentacrinus of the American and British seas.

The various forms of encrinites with which you are familiar, occurring so abundantly in ancient strata, and particularly in the oldest limestone formations—the limestone belonging to the transition formations,—abound with singular forms of these fixed radiated animals, amongst the oldest inhabitants of this globe with which we have now the means of becoming acquainted. The bodies you now look upon, composed of detached joints, some circular, some pentagonal, are portions of the stem and branches of the pentacrinites and other crinoidea. Various other forms belong to this almost extinct tribe. We have at this time, living in different parts of the ocean, and even on our own coast, two animals belonging to the genus pentacrinus—the *pentacrinus Europæus*, and *p. caput medusæ*. They are precisely of the character which we have every reason to believe has belonged generally to this family, possessing a peduncle, and that calcareous peduncle being moveable, and found attached to rocks or plants at the bottom of the sea. One has been found in the Bay of Cork in Ireland. In ancient seas they were so abundant, that we find entire rocks and strata composed of their remains. In this mass of limestone you can scarcely see anything but fragments of the fixed, jointed, echinoderma belonging to this crenoid family. Each of these forms of the crinoidea pos-

sesses a mode of formation peculiar to itself, both in the forms of the several pieces, and in the mode of their union, particularly at the upper extremity of the peduncle or axis, the body of the animal from which the radiated extremities diverge.

The forms and nature of the skeleton of these animals offer an interesting subject of study for the geologist, because of the numerous entire families of them which occur only in a fossil state, and in the oldest rocks. There can be no doubt that they have all contained the phosphate, along with a much larger proportion of the carbonate of lime,—that they have been unorganised skeletons which have been formed, by successive depositions around each joint, from an exterior enveloping animated fleshy covering, as in the existing pentacrinus of our own seas. They appear as if formed by the union and consolidation of all the pieces which enter into the formation of each ring or segment of the asterias and other radiated-existing animals.

On examining the arrangement and the forms of the separate little pieces which surround each segment or ring of the stellerida, we observe great regularity and constancy in the disposition of all the parts. They are composed chiefly of the carbonate of lime, but they contain also a little of the phosphate, as shown by HATCHETT. The phosphate of lime has been found by the recent analyses of STOLTZE to be in greater proportion in the solid forms of the skeleton we meet with in the echinida than in the stellerida; but still the phosphate of lime does exist in the solid pieces of this asterias which I hold in my hand. When we examine the disposition of the several parts of the external skeleton of the asterias or the ophiura, you perceive that they are placed in numerous contiguous circles round the divisions of the body—those divisions through which the intestines and the ovaries extend in the asterias. These circles or rings are composed generally of eight pieces, but the number of segments or rings varies according to the age or the state of development. Eight are counted in the case of the animal I hold in my hand —the *asterias aurantiaca*, so minutely described by TIEDEMANN and by MECKEL. These eight pieces are disposed in a circular form around the arms or divisions of the body. Sometimes these rings are extremely numerous. In the specimen I have here, there have been counted eighty rings in each ray. There are five rays here, as there are in the greater number of the species of asterias. It is thus apparent, then, that there are about from 640 to 700 separate pieces in each ray of the body; and in the whole about from 3200 to 3500 separate pieces, surrounding the rays in this five-rayed species. Now you will observe, that the larger pieces are generally placed towards the lower part of each of the rays of the body along the sides of the ambulacra. They form the sides of the rays; and in the centre below we find, between the lateral rows of pieces, numerous oblique circular perforations—through which extend, in the living state, the minute circular tubular fleshy arms by which the animals fix themselves or move to and fro. The perforated portions of the skeleton (which you perceive is of considerable density) occupy these central grooves, and are denominated the ambulacra, so that you observe here five ambulacra, one extending along the base or lower part of each of the divisions. The stronger lateral plates give origin generally and support to spines which project from their surface. These spines are moveable, and, no doubt, frequently used in progressive motion as well as in defence. In the contracted state of the animal these spines along the sides of the ambulacra being brought near to each other below, protect the extremities of the arms, which are retracted into their small perforations. The upper part of the body of these animals has calcareous portions, generally smaller, and thrown to a greater distance from each other. The integument is extremely coriaceous. It is capable of great contractility when irritated. It is capable of being extended to a considerable degree by the water taken in for respiration. It is capable of great extension, for containing the reproductive gemmule-sacs, called the ovaries. But when in the distended and translucent state, if irritated or injured, you will soon observe it contract and become opaque at the part touched. Looking at the upper surface of this irritable integument, you will see it is traversed by numerous white-coloured opaque lines. These are rendered firm and opaque by the quantity of carbonate and phosphate of lime which this reticulate part of the integument contains. Between two of the legs or divisions of the animal you will observe on the upper surface a circular, small, convex, solid body, which on being examined with a lens, has much the appearance of the large meandrina—the brain madrepore which we had on the table yesterday. It encloses in its inner surface a sac, which contains a thick grumous substance, which is found by analysis to consist of carbonate and phosphate of lime, but no urea. Urea was expected to be found in it in con-

sequence of distinct organs for secreting that substance in other animals being found. There is a glandular sac observable in it, which was thought to be designed to separate from the nutritious fluid circulating in the vessels around it, the calcareous substance which was to form the skeleton. This was the opinion of TIEDEMANN. MECKEL, however, from observing that this earthy matter in other animals is formed at the points of the body where it is deposited, and that this calcifiant glandular sac is least developed where the earthy skeleton is largest, considers it as not subservient to the separation of the earthy matter for the skeleton, but that it is an organ destined to excrete something from the bloodvessels with which it is connected, rather than to separate those earths to form the skeleton.

The divisions of the body in the animals of which I have been speaking, belonging to the genus *asterias*, contain, as I have mentioned to you, the viscera of the animal, particularly the intestine and the ovary, one of these on each side of each division; so that in this specimen with five divisions there are ten ovaries and ten cæca. But in the animals I now hold in my hand, the ophiuræ, which so much resemble the asterias that formerly they were placed in the same genus, the divisions of the body do not contain the viscera. The viscera in them are confined to the large central disc, from which radiate the divisions of the body, and those divisions are more like true extremities for progressive motion.

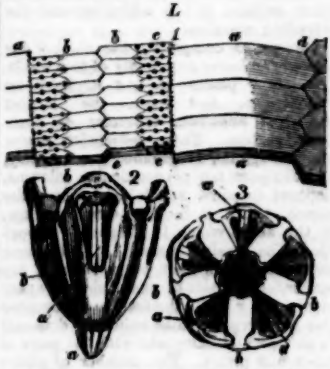
In examining the pieces which surround these extremities of the ophiura we find the arrangement, and even the number of the pieces, to correspond singularly with those composing the rings or segments of the asterias; and, as you observe in this *ophiura, echinata*, the pieces have often spines attached to their outer surface. These external calcareous spines in the *stellerida* are generally attached by moveable articulations to prominent tubercles, as in the more solid forms of *echinida (M)*, and in all these animals they appear to be formed in the same manner by the transparent investing membrane, without possessing any internal means of growth or repair. The spines on the soft backs of the asterida are often extremely numerous and minute, and elegantly arranged in groups; they may prove a means of defence by being collected closely together during the contracted condition of the skin. Sometimes they are white, and sometimes they have colours which contrast beautifully with the deep hues of the skin. They have no apparent source of nutrition at either extremity, or in their middle; but they appear to grow, like shells, by additions to every part of them which is next to the enveloping fleshy substance. The central disc of the ophiura is surrounded by pieces like those which surround the central body of the asterias; but here they are large and more solid. There are ambulacra in the ophiura as well as in the asterias, and those ambulacra are perforated in the same way, for the feet by which these little animals move to and fro. Even the ramifications of the body of the euryale are surrounded with rings, much more complete than in the case of the asterias, and more complete than in most of the ophiuræ, which remarkably agree with those that surround the extremities of the asterias, but the component pieces are observed gradually to anchylose, and to meet above, where there is a deficiency occupied by soft skin in the asterias. Thus we are gradually led to the simplest form of the asterias in passing upwards through all the jointed and radiated forms of the echinoderma. We saw the jointed, ramified, and fixed skeletons of the corallines, dichotomariæ, ises, and other calcareous zoophytes, which led us naturally to the fixed and ramified skeletons of the numerous extinct forms of crinoidea, and to the existing genus *pentacrinus*. These skeletons, like that of the *isis* (*G* 1), were formed by depositions of earthy matter from an enveloping fleshy crust, which we can trace through all the higher forms of echinoderma. The solidity of the joints in the family of crinoidea, accords with their fixed condition at the bottom of the sea, and corresponds remarkably with the condition of those joints in the polypiferous animals. But the central cavity of the joints enlarges, and the segments consequently become more flexible and soft, as we ascend to simpler forms in passing up through the *comatulæ*, the *euryale*, the ophiuræ, and all the forms of *asterias*. The internal cavity thus developed in the centre of the skeleton becomes the seat of organs more and more complicated and important, and the outward appendices and ramifications become less and less numerous and subdivided. The component pieces or elements of the original solid segments are thus enlarged, detached, and kept apart, and admit of free motion upon each other. A greater development is thus allowed to the important organs of digestion, generation, circulation, and respiration, so complicated in the asterias. The elements of the skeleton in higher forms, in place of constituting a mere solid axis of support, as in the crinoid family, are now employed to consolidate the walls of an increasing abdominal cavity, and

the original numerous ramifications, which composed nearly the whole animals, are now diminished to mere spines for defence thrown over the exterior of the general cavity. The component pieces ossify and expand around this abdominal cavity, so as to compose an exterior shell, like that of the articulated and molluscous classes, in which, however, the original pieces are still perceptible, and necessarily kept asunder, to allow of the requisite growth and expansion of these external globular and unorganised coverings. In rising from the depressed and even divided forms of the *scutellæ*, so closely allied to some of the *asteriæ*, to the more convex and globular forms of the echinida, the solidity of the whole exterior skeleton increases. The component pieces or external plates become thicker, stronger, and more artfully united in the construction of the edifice, and the exterior spines become larger and more solid. The forms of those skeletons of the solid echinida which now exist, would appear much more isolated, were we not familiar with many of the fossil forms so abundant in our chalk formations, which often present the intermediate links of gradation which have disappeared from the present surface of our earth. By the lengthening of the axis of the globular *echinida*, and the softening of the exterior shell, nature has arrived at the forms of the various *holothurdiæ*, and these lengthened, cylindrical, and soft echinoderma lead us naturally to the worms at the bottom of the articulated division of the animal kingdom.

It is interesting to observe, as we thus rise in the scale of animals, the gradual simplifying of the outward forms, accompanying the increased elaboration of the internal mechanism. The vital energies of the zoophyte, like those of a plant, are spent in the endless repetition of the simplest parts of the structure, in the production of ramifications in which the structure is everywhere similar, and everywhere simple. But as the central abdominal cavity is developed in the *crinoid* family, the outward ramifications diminish, and, important organs developing in that cavity in higher echinoderma, we see the outward ornaments all cut off, and the vital energies of the echinida directed to internal development. We can trace this inverse ratio of the outward and inward developments throughout all the higher grades of animal existence. The wild irregularity of the inferior plant-like forms becomes now softened down to a symmetrical arrangement of all the parts around an axis, previous to their disposition on each side of a median plane, which is the symmetry of the most elevated forms of animals. At the outset we could scarcely perceive any unity of plan either in the materials or the construction of the polymorphous skeletons of the poriferous animals, or in the innumerable forms of zoophytes. But now we begin to perceive a unity of plan to pervade the structure of the most diversified skeletons of the echinoderma. And it is above all things important for you to watch nature's mode of procedure in the gradual development of new forms; how she can vary the form of her elements in the construction of skeletons without once quitting the plan she has adopted through extensive series of forms; for if you can perceive this in the skeleton of animals so low in the scale, how much more must you expect a unity of plan to be manifested in more important systems of the economy, and in higher forms of organization! The low condition of the organization, particularly of the nervous system, of the echinida, requires every means of protection and support from their skeleton, which thus envelops their whole body, and their vital functions are yet inadequate to the periodical casting and renewing of so large a mass of solid matter. It is beautiful to see how nature has contrived to provide them with a skeleton which is extravascular and unorganised, like the shells of molluscous and articulated animals,—which envelops every part of their body,—which is not periodically cast off to allow of the enlargement and growth of the contained organs,—which does not consist of open valves to allow of increase by the addition of new layers within, nor of an open cone like the shell of a gasteropod,—and which yet presents no impediment to the rapid growth of the soft parts contained within this hard unorganised ball. From the depressed forms of the *scutellæ*, which come so near to some of the *asteriæ* we were last examining, through the more convex forms of the *clypeasters*, the *spatangi*, the *nucleolites*, the *galerites*, and other fossil genera, to the globular forms of the existing *cidares* and *echini*, we find the whole skeleton to be composed of an elegant mosaic-work of distinct pieces, most methodically and beautifully arranged, to afford stability to the whole fabric, and the means of continued increase and expansion during the entire life of the animals.

These solid skeletons of the *echinida*, to give them greater hardness, contain a greater proportion of the phosphate of lime than the moveable articulated skeletons of the stellerida I have been describing. The carbonate and phosphate of lime here form a solid exterior mass, which is, however, composed of minute

pieces symmetrically constructed and beautifully arranged in perpendicular columns. In these animals, when we observe the manner in which the skeleton is constructed, we find that the same component pieces which surround the body of the asterias, are developed, meet each other, become consolidated by numerous layers, and thus form the great globular disc. The ambulacra of the asterias are here bent up to meet at the anus, and the integuments are spread out to enclose a sphere. The arrangement of those pieces in the *echinus*, is thus in perpendicular columns disposed in alternate pairs (*L* 1). This you can best examine when the shells have been well macerated and bleached, and as the numerous sutures never anchylose, the structure is equally obvious in the adult and the young animals. On account of the coat of colouring matter, and the numerous tubercles on the outer surface, the elegant and symmetrical arrangement of the pieces is much less obvious there than on the inner surface of these shells. The columns are disposed in parallel series, extending from the apex to the base of the shells, and the lines by which they meet present a zigzag appearance (*L* 1, *d*, *e*), or a very regular serrated suture, from the polygonal form of the component pieces. The most familiar example I can select to illustrate the mechanism of these solid external skeletons, and one which presents the most regular and simple form, is the sea egg, the *echinus esculentus*, so abundant on all parts of the coasts of Britain and of Europe. As the soft and growing parts of the animal are completely shut up in this globular shell, it is obvious that the shell could not grow, like that of molluscous animals, by the addition of continuous layers to the inner surface of the whole parietes, as that would diminish instead of enlarging the interior cavity. The shell itself is of a hard and porous texture, homogeneous throughout, and without vessels or any internal organization to enable it to provide for its own increase and repair. The shell is composed of the same chemical elements, and has the same kind of uniform texture, as the exterior hard coverings of the crustacea, and, in like manner, has its layer of colouring matter confined to the outer surface, but the form of the shell and the attachment of the intestines, the respiratory and all the other organs of nutrition to the inner surface, render it impossible for this animal to throw off its outward covering, even if it possessed the means of existing for an instant without the shell, or had an organization fitted to secrete periodically and rapidly so large a quantity of earthy matter. The division of the shell into innumerable small pieces of such a form and so united as to allow of the continual addition of matter to their surface, was, therefore, necessary to the growth of this skeleton of the *echinus*, and of all the *echinida*. No trace of fibres or layers of any kind can be detected in fractured or polished portions of these uniform porous plates composing the globular shell. They appear to be formed in the same manner and in the same part of the body as the hard parts of the stellerida we were last considering. All the calcareous portions of the echinida, the plates, the tubercles, the spines, and perhaps the oral apparatus itself, appear to be deposited in the substance of the skin which envelops them on every side. You will observe by the polished sections of the plates, that the colouring matter of the surface passes generally under the base of the tubercles; and, in the polished transverse and longitudinal sections of the large spines, that it passes generally through their whole interior texture, as it does to some depth in the substance of the plates. Thus the plates, and tubercles, and spines, being everywhere surrounded with secreting, soft, animal matter, are kept constantly asunder, and the whole skeleton is enabled to expand, and to grow in the exact proportions of thickness and size required by the growing animal.



The pieces which compose the shell are polygonal (*L* 1, *a* 3), lengthened transversely with relation to the axis of the animal, and are disposed in perpendicular columns, extending from the mouth to the anus. The number of columns is very uniform in these animals, but the number of similar pieces composing a column, varies with the species and with the age of the individual. The new pieces which are added as the animal enlarges, are inserted at the anal margin, where they are, con-

sequently, always small, and they appear not to be added at any other point. The pieces are thus gradually pushed down towards the middle or base of the column, by those which successively make their appearance at the upper narrow apex of each perpendicular series. From the analogy of the articulated and molluscous classes of animals, I had formerly imagined that these plates of the echinoderma were exuded from the surface of the skin and beneath the epidermis, and that they increased in every dimension by the addition of calcareous matter to their inner surface and around all their margins. But the homogeneous internal structure of these pieces presents no trace of such successive depositions, and more closely resembles the porous textures of shells which are formed by one deposition, and which are periodically cast and renewed. The tubercles also on their outer surface have a distinct source of growth in the common superficial secreting skin which passes under their bases and around every calcareous portion of the skeleton. The thickening of the lateral margins of each tubercular plate (*L* 1, *a a*) during its growth, while the curve which its inner surface forms remains unchanged in the middle of the plate, accords more with the addition of matter to the outer than to the inner surface, and is added around the extending margins.

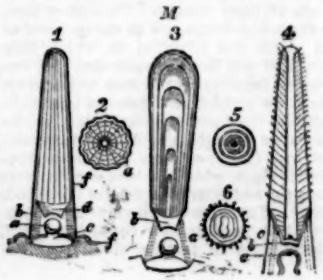
The plates composing the shell of the *echinus esculentus* are chiefly of two kinds. The larger pieces (*L* 1, *a a*) have no perforations, and have the largest and most numerous tubercles on their outer surface. These *tubercular plates* are pentagonal, lengthened transversely, and compose ten perpendicular columns, disposed in pairs, which extend from the mouth, which is in the centre below, to the anus, which is diagonally opposite. The smaller plates (*L* 1, *b b*) have few tubercles on their outer surface, are perforated by pairs of small oblique apertures (*L* 1, *c c*) for the feet, and compose also ten perpendicular columns, disposed in pairs, which alternate with the pairs of tubercular plates. The number of plates in a column varies, as I have mentioned, according to the age or size of the animal, but in the large shell which I hold in my hand, there are thirty-two tubercular plates in each column, making 320 plates of that particular form in the ten columns. The tubercular plates, where they meet each other in the line of junction of each pair of columns, terminate in obtuse angles, which are inserted between the salient angles of the opposite column, so that the line of junction of two columns of tubercular plates, presents always a very regular serrated suture (*L* 1, *d*), which strengthens the articulation.

The perforated pieces, or *ambulacral plates*, are much more numerous than the former kind, and are placed in perpendicular pairs of columns in contact with each other; so that there are five pairs of these ambulacral columns also, which alternate with the pairs of tubercular columns. One half only of the surface of the ambulacral plates is perforated with oblique pairs of holes for the fleshy suckers of the *echinus* (*L* 1, *c c*). The other half of these ambulacral plates is free from perforations (*L* 1, *b b*), and tuberculated on the outer surface like the larger tuberculated plates. The columns of ambulacral plates meet each other by obtuse salient angles, and produce at their line of junction the same regular serrated suture as the larger plates (*L* 1, *e*). But the line of junction between the ambulacral and the tubercular columns is more irregular and minutely serrated. There are about two and a half of the ambulacral plates corresponding with the end of one tubercular plate, so that in this specimen of the *echinus* there are 80 ambulacral pieces in each column, or eight hundred ambulacral plates in the whole ten columns which are interposed between the ten columns of tubercular plates. Thus there are 1120 pieces in the twenty columns which compose this shell. The ambulacral plates, however, appear to be further subdivided at their perforated ends by small lines which pass through the middle of all the holes for the feet; so that these perforations seem not to pass through the solid porous substance of the shell, but to be placed between very small plates to allow of the increasing diameter of the holes during the whole growth of the feet. The minutely serrated appearance of the outer margin of the ambulacral pairs, where they join the tubercular pairs, is produced by the ends of these very small perforated pieces. Around the mouth of the *echinus*, and around the centre of the upper part which is the anus, you will perceive that the plates have different forms from those composing the sides of the body. Those which compose the upper part around the anus, are perforated by five small round apertures placed at equal distances from each other. These five apertures around the anus give passage to the terminations of the five oviducts. Those five sacs of little round reproductive bodies in the *echinus* are the ovaries; and there is a little duct, as you will observe, which runs from each, and terminates at each of those perforations round the anus. Those heart-shaped perforated pieces are the genital plates. They have been also

called the ovarial plates. They are called so to distinguish them from the others which are more uniform. Around the mouth you will observe extending inwards the muscular plates which give an extensive surface of attachment for the muscles that move the teeth (*L* 2, *a*) — the apparatus for subdividing the food. These five internal plates correspond in number and in position with the five alveoli of the teeth. The alveoli (*L* 2, *b*) of the teeth have here a lengthened pyramidal form; they are hollow; they are five in number; they are hard as the other parts of the skeleton, and they contain teeth of great length (*L* 2, *a*; 3 *a a*), one in each alveolus. The parts of the teeth which project beyond the mouth, which are capable of being thrust outwards a little way from the mouth, are extremely dense; but if you trace these five teeth upwards through the alveoli, you will find they are composed (and it is a curious subject for those who are inclined for minute inquiries into those matters) of minute shining crystalline fibres—fine as the finest asbestus. They are so soft in the upper part (*L* 3, *a a*), where they are newly formed, that between the fingers, like a piece of the finest down, you reduce them to their natural detached fibres. But as they are worn and reduced at their lower part, by acting on the shell-fishes on which they feed, this soft part passes down through the alveolus, is cemented by hard enamel, becomes harder by pressure, and is prepared for action by the time it arrives at the end of the alveolus, so that there is a constant renewal of these teeth above, and they are never perfected, but constantly keep growing. There is a remarkable resemblance in these to the teeth of the rodentia, the incisor teeth of which are never perfected, but are always rapidly worn away, and the pulp is always ready to renew them in proportion to their constant wearing. In the other forms of these globular echinoderma, belonging to the genus cidaris, you observe the same apparatus of teeth for mastication, and the same general arrangement of all the kinds of plates. I hold in my hand the *spatangus purpureus*, a beautiful species, principally found on our own coast, and you will observe in it that the plates on the upper surface are perforated in the same way by apertures, forming four ambulacra like the five pairs in the echinus; but in the mouth there are no alveoli nor teeth. The animals belonging to this genus spatangus, destitute of teeth, feed not on the same sort of hard shell-fishes as those that have teeth, but take the moist sand and the minute animals it contains constantly into their intestine. The whole of their intestine is filled with the moist sands of the coast. There are thousands of animals which feed on nothing else but the living matter contained among the particles of sand on the sea coast. You will find the animals thus employed to get all the animalcules, all the red-blooded worms, and the myriads of soft minute molluscous and crustaceous animals which are mixed up with the moist sand. You will find them to have their stomachs and intestines in the living state gorged with sand. This requires no teeth on the part of the spatangus, and we find it to have none. The spatangus, as you will observe, has its body depressed; the mouth is not diagonally opposite the anus, but near the anterior margin below. The anus is at the margin behind. Now this depression of the whole body going on still, would lead us to the animals called clypeasters and scutellæ, in which the composition and texture, and the general structure and mode of growth of the skeletons, are the same. Such are the principal forms of the skeletons presented by the echinida, and the principal forms met with in this class.

You perceive they are all formed of jointed pieces; and we are led to that form by various forms of the isis and corallines, which, as you see, are jointed calcareous skeletons (*G*); so that there is a transition thus from the lowest classes to the more complex forms of the *articulata*, and we have also a connecting link between these radiated classes and the helminthoid forms of the lowest articulata, for the lengthened cylindrical soft bodies of holothuridæ and syphunculi already present the vermiform shape of the *annelida*.

Besides the longitudinal columns of solid plates which we have seen to encompass the body of the echinida, their outer surface is covered with tubercles, which rest upon the surface of the plates, and adhere to them, in the same way as the plates adhere firmly to each other at their sutures, even after considerable maceration. These exterior tubercles have a



spreading base (*M* 1, *c*), which rests upon the coloured surface of the plates, although I have often seen them anchylosed to the surface of the plates, and the colouring matter gone from below their middle. These expanded bases support each a little round tubercle, shining and smooth like a bead of pearl. These little shining beads, which you perceive to be rounded and smooth, without any perforation in the *echinus* (*M* 1, *a*), are more frequently perforated in the middle, as in these large tubercles of the *cidares* (*M* 4, *a*), and in these minute tubercles of the spatangus. The tubercles are very irregular in their size and in their arrangement in most of the genera, but where they are very large, they are arranged with great symmetry, as you see in the cidares. These tubercles support the exterior moveable spines (*M* 1, 3, 4), which have a concave proximal end to correspond with the convexity of the tubercles, on which it freely plays. The mode of growth of these spines which appear thus detached from the general skeleton, and which are moved by strong muscles (*M* 1, *b*; 3 *a*; 4 *c*), extending from around their base to the margin of the wide base of the tubercle, is as obvious as that of the articulated plates of the shell, particularly as we are speaking of skeletons which are not nourished by vessels permeating their internal texture, nor organised like the fibrous bones of vertebrata. The skeletons we have been examining are unorganised substances excreted by the animals for protection and support, and, when formed, are almost beyond the further influence of the soft parts which excreted them. It would appear, however, from the gradual enlargement of the ambulacral holes (*L* 1, *e*, *e*), (and still more of the ovarial apertures which pass through solid plates), that the contact of the living parts still exerted an influence on the forms of the hard parts after their first formation. It will, however, be a long time yet before we come to skeletons of an organised nature, of a fibrous structure, to allow capillary blood-vessels, absorbents, nerves, &c., to permeate all their texture. The spines here, in the echinoderma, are as unorganised as the plates and tubercles on which they rest, and yet, like the tubercles, they enlarge as the animals advance to maturity. They are striped and grooved longitudinally on their outer surface (*M* 1, *e*) like a coral or a gorgonia, and their transverse fracture (*L* 2) exhibits numerous concentric rings, which are best seen in these large cut and polished spines of the *cidaris* (*M* 6). These concentric rings are all traversed by innumerable continuous radii, which shoot in straight lines from the central ring to the circumference of the spine, as in the stem of a madrepore. The radii are of a denser texture, as is seen by the high polish they receive in the transverse section, and they terminate in the longitudinal ridges (*M* 1, *e*; 2), which mark closely the whole outer surface of the spines. That part of the spine (*M* 1, *d*) which is enclosed within the capsular membrane, by which it is connected to the tubercle, is generally of a very distinct, compact, homogeneous, dense texture, and forms a thick crust over the concave articular end of the spine, where it is most liable to friction. This white compact crust is spread over the proximate ends of all the superimposed cones which form the solid spine, and appears to be secreted in a fluid state by the enveloping capsular membrane. The successive depositions of earthy matter within this capsule, increase the thickness and length of the base of the spine, and of the tubercle; and the skin or membrane (*M* 1, *ff*), which covers the surface of the animal, is continuous with this capsule, and with the membrane which forms the jointed calcareous pedicellate organs, and the superimposed cones of the spines. There is no cavity for any secreting substance within these spines, and no capillary vessel permeates their spongy texture between the denser radii of which I spoke, so that there is nothing to explain the mystery of their development, but the continuation of this exterior capsule (*M* 1, *ff*, 2 *a*) along the grooves of their striated surface, as we have already seen so often on the solid laminated surface of calcareous zoophytes. The jointed calcareous minute moveable organs terminating generally in three slender spines, which you observe so numerously placed among the ordinary solid spines of the echinus, are commonly called pedicellariæ; and some have thought they served the purpose of tentacula to the animal, while many others have imagined they were distinct animals, and have described them as a species of zoophytes. Each pair of holes in the ambulacral plates (*L* 1, *e e*), serves for the transmission of the injecting vessels of one of the feet—the vessels which distend the tubular feet with water, so as to project them to a distance from the surface of the skin with which they are continuous. From the soft and pulpy state of the external skin of these echinida, it is probable that the earthy matter which it secretes is thrown out in a semi-fluid state, so as to allow its particles in consolidating to assume somewhat of a crystalline arrangement; and from the low state of the organization of this fleshy, thin, superficial layer, it would oppose the less re-

sistance to the operation of the ordinary affinities of the calcareous particles. These particles, in uniting with those already consolidated in the spine or plate, would, therefore, arrange themselves in a very definite order, by certain sides in preference to others, according to their natural attractions in crystallising, as all earths, in consolidating slowly from the fluid state, crystallise according to the primitive forms of their respective crystals. The carbonate of lime is here in the greatest proportion, and in consolidating to form the unorganised skeletons of echinida, or the stellerida, or the crinoidea, it will stamp a rhomboidal character on the solid textures which it forms. The rhomboid which belongs to crystallised carbonate of lime has its acute angle about 84°, as we observe it in the fragments of these large fossil spines of cidarites, and in the fragments of these fossil shells of ananchites, galerites, spatangus, and many others from the chalk beds, which are fossilised by calcareous spar. M. Haidinger, a distinguished German mineralogist and crystallographer, some years ago observed that the fragments even of the recent spines of the cidaris (*M* 4), exhibit the angles belonging to the natural rhomboid of the carbonate of lime. If this form of cleavage could be detected in the natural spongy and complicated spines of the recent cidaris, it might be conceived to be much more perfect in the dense though minute spines of our recent echini. The phosphate of lime being in small quantity in the skeletons of these simple organizations, has not given the predominant character to the form assumed by the two earths in consolidating. The spines of echinida are organs of defence and of progressive motion; they are held in connexion with the shell, and are moved in every direction by the contractile, irritable, fibrous, and secreting layers, which envelop them. They are small in echinus, spatangus, &c., where the shell is large, and they are large in cidaris, where the shell, to which they are attached, is small. From the magnitude and solidity of the spines of cidaris, and their possessing no internal living flesh or internal cavity, it is not improbable that the calcareous matter forming the first deposited inner cones, may undergo a continued, though almost imperceptible, change towards crystallization during the lifetime of the animal, as they are early withdrawn from the influence of vitality, by the deposition of successive unorganised layers above them and around them on every side. These remarks you may consider as more or less applicable to all the calcareous skeletons of echinoderma, for we have seen that the plan of their organization could be traced with great uniformity through their most diversified forms. We have traced the chain of forms, from the jointed isis among zoophytes, through the jointed, ramified, and pedunculated crinoide families; through the ramified, creeping stellerida, freed from their peduncle, and simplifying in their divisions; and from the simplest asterias, through the swelling echinida, to the globular cidaris and echinus, so that the calcareous matter has very probably obeyed the same physical laws in consolidating the skeleton of all these echinoderma Now that, standing alone, is not calculated to arrest much attention; but to the physiologist, and even to the anatomist, it is capable of inducing many serious inquiries connected with the consolidation of skeletons by earthy materials. We know now that the saline matter in those pulpy substances which compose the greater part of the succulent fruits of vegetables, are partial crystallizations, though not in a solid state; this has been minutely illustrated by Sir David Brewster, by observing their effects on transmitted light. You have seen in the skeleton, where it was entirely composed of siliceous matter, that it assumes the form which silica naturally assumes in crystallising. We find on the back of the asterias several portions of the carbonate of lime, shot up in beautiful transparent crystalline bodies. Thus, looking at them alone, you would not have supposed them to have been the product, or a part, of a living organised being. Nothing is more common than the deposition of siliceous matter in the common reeds, straw, canes, and other plants. So that you observe that this manifestation of physical laws operating in the animal economy, increases as you descend in the scale. It is almost impossible for us to trace the operation of physical laws, in the complexity of the machinery of the highest animals, where there are so many conflicting forces continually in operation. It is however maintained of late, that in the *human* subject the earthy matter of the bones has a partially crystallised arrangement.

Now these spines of the *cidaris* acquire great size, and often get the outward form, as they have the internal structure, of a belemnite. Each has its tubercle; the tubercle is surrounded by a capsular membrane, and, to give more firmness in this animal, has in it a small perforation (*M* 4, *a*), as if for a *ligamentum teres*, as in our femur. In the small spines of *echinus* that provision is not necessary, and does not exist. Now nothing is more common

than to find in a fossil state, in chalk formations particularly, large spines of this kind fossilised. They look like belemnites by their tapering form, and by their internal laminated structure. To the skeleton of the cephalopoda the belemnites belong. They are not polythalamous belemnites, because you will observe, that in uncovering one of the extremities, it has the usual distinct groove (*M 4, b*) which receives the tubercle of the shell, the parts of which have disappeared. Nothing is more common, also, than to find the fossilised tubercles of the cidaris detached. Here is a specimen in which they are detached in a mass of chalk. Thus, from an acquaintance with the recent forms, you have the best possible key for the interpretation of the remnants left us of ancient worlds.

Now on looking back to the conditions of the animal organization accompanying the conditions of those simple skeletons, you will perceive, that although we had an intestine, a stomach, or stomachs, developed from the beginning, we had scarcely a trace of nervous system throughout several of the classes. No nervous filaments were ever discovered in a polygastric animalcule, no nervous filaments were ever discovered in a poriferous animal, nor in the whole class of polypiferous animals. They begin to appear in the *acalepha*. I think I have seen them, and I gave a description, a few months ago, to the Zoological Society (which has just published its memoirs), of the nervous system in the *beroe*, one of the acalepha. In the echinoderma, the nervous system is well known to exist in the form of circular filaments around the mouth, and which shoot out smaller filaments to each division of the body, as in the asterias.

Now you ascend as high as the echinoderma before you come to muscular fibres, so that there is a simultaneous origin of the nervous system and of the muscular system, so far as relates to their fibrous disposition.

Another consideration forces itself upon our attention. We have seen vast masses of lime thrown down by the simple beings which we have hitherto considered. We have seen this done by the simple gelatinous bodies of the polypiferous animals, as we have seen in those of the poriferous, and, in the more complex, the acalepha, and the echinoderma. When we speak of animals low in the scale, it is equivalent to our speaking of animal forms that have existed in the primitive conditions of this planet; for everything shows, that this kingdom itself has had a development from the most simple forms, and that in the first condition very likely nothing existed but myriads of animalcules swimming in the heated ocean that encompassed this cooling planet. It matters not whether we fancy that those now existing are the same forms changed by circumstances, or that there have been at every successive instant new creations; naturalists differ on that speculation,—almost an idle speculation, where we can only arrive at a probability.

Now, then, we see that in the earliest conditions of our planet there existed myriads of beings, whose obvious function was to precipitate vast quantities of the carbonate of lime, in an insoluble state, into the form of solid masses of corals and almost rocks, and those operations continue to the present time. As they remove from the vast abyss that quantity of lime, and lime combined with other acids besides carbonic acid, they remove that which is constantly brought into the bed of the ocean by the rains washing mountains, washing continents, then becoming rivers, and accumulating those saline materials which are brought by streams to the ocean, and never carried up again from the sea by evaporation; so that there is a continual influx of these corrosive materials into the ocean. We thus perceive how they are precipitated in an insoluble state, and how the ocean is purified for the maintenance of higher animals. We see beings continually engaged in forming it upon sub-marine ridges, and forming a covering to mountains of the carbonate of lime. It is curious that where there is the greatest deficiency of land, those operations are the most abundant, as in the Southern Ocean,—that, in fact, great continents and islands are there preparing under water, with a surface of the richest of all soils for vegetation—the carbonate of lime—to be thrown up at some future period of the earth's duration by a volcanic agency—to be raised up from the bottom of the sea into the air, there to become the nidus of vegetation, from materials washed up by the sea, as well as by seeds left in the excrement of birds of passage during their migrations over the ocean to various parts of the world. Those at last become covered with plants and animals, and man takes possession of the newly-formed islands. But it is interesting to see how the minutest beings are so important in the general and grand operations of nature. In many of the southern countries, in Africa, on the coast of Asia, where there are vast accumulations of sand, moving sometimes over whole nations, and burying the solid strata of rocks, the vast quantities of those solid corals on the coasts, particularly the meandrinæ, the astrææ, the madrepores, and the larger lithophytes, are

found to block up the coast. This is the case in some parts of the passage to India, and in the passage to China; it is the case with the Red Sea, a great part of the South Seas becoming almost unnavigable from the hard masses covering the volcanic ridges that traverse those parts.

The solid materials, then, formed by zoophytes, serve instead of limestone in those parts in which it is not to be obtained. Men use them as a manure for the land; they use them as rocks for building, and burn them for mortar; so that they have in these productions of animals, all the advantages of limestone rocks, formed by a gradual precipitation from the sea.

There are hypotheses—but it is almost foreign to our present subject to enter upon them—connected with the formation of all limestones in the earth. It has been a favourite theory of La Marck, and many others, that all the limestones which exist on the crust of the earth owed their origin to organic beings; that there could be no other means of their formation but by organic beings; and they think they are substantiated in this view, by observing that the primitive limestones, as they are called, have a granular and foliated appearance; and that they do not extend, like the layers of slate, of gneiss, and other strata of that description, but that they occupy detached circumscribed portions of the strata, as if they had been the product of primeval beings accumulated in the depths and cavities, and thus constituting those granular masses which we find to exist. They think it proved by examining all the series of limestone, as we rise from the greatest depths of the crust of the earth to the newest formations; that they increase in quantity as we ascend; that organic forms were multiplying in proportion as the surface of the earth became developed; that, therefore, at this moment there are much greater operations going on in this matter than at any preceding time; that the chalks, for example, which are the nearest of all the secondary rocks, and form the beds on which rest the tertiary and later formations, exceed all preceding formations of limestone; that nothing but fine particles of lime can be found in the component parts of the chalk; that as you pass down to the primitive formations, the limestone becomes smaller and smaller in quantity, the organic beings which formed it only then beginning their operations. But these considerations lead us from our subject, although the present topic is intimately connected with geology, and there are many other relations of these studies of sufficient interest to merit attentive consideration.

I must introduce still one remark before proceeding to the *articulata*, touching another circumstance I promised to allude to before concluding the class echinoderma. I mentioned to you that in the chalky formations we should find, besides the poriferous animals converted into flints, many of the echinoderma which have no siliceous matter entering into the composition of their shells, and that their fossillization could be accounted for on the ground that their intestines are filled with siliceous sand, which in the living state they are constantly swallowing with their food. This siliceous sand, filling their whole intestine in the living state, becomes the nidus around which the flint, which is likewise silica, accumulates. Nothing is more common than to find the echinus, the spatangus, and others, in chalk formations completely converted into flints. Now the whole shell of the animal which I at present show you, consists of the carbonate of lime and a little of the phosphate. And why is the earthy matter conveyed by the waters through the chalk bed, silicifying these echinoderma, and not converting their internal central cavity into the carbonate of lime, like their crystallised calcareous crust—not converting them into calcareous spar? The body of these animals contains a large quantity of silica, which is taken in by the mouth and fills the intestinal canal, as I mentioned to you, but there is none in the shell. The spantagus, which has no teeth, I have found employed constantly in conveying the moist sand of the sea-coast through its intestine; and if you open one of them, found alive on the coast, you will always see the intestine gorged with sand, from the one end to the other. They extract no nutrition from the silica; indeed, we know of no animal that can do so, although many animals live by conveying through their body the moist sands of the shore, but then they live on the organic beings which abound in those sands. Now you observe, that when these were thrown down in the ancient seas, upon the chalky bottom, with their intestines filled with sand, when all the animal matter was removed from them, and when even the shell was removed or changed into calcareous spar, the interior cavity became a nidus for the particles of silica to accumulate around,—around the grains of silica that existed in the intestine. This, then, appears to be one reason for the echinoderma being so abundant in the chalk formations, silicified, or fossilised by silica.

Now if we compare this primitive form of a skeleton in the lowest division of the animal kingdom (in detached portions through the body of the gelatinous substance, as in these simple animals),

with the first condition of the skeleton of the highest animals—nay of man himself,—there will not be wanting an apparent analogy. If we did not know what was to be the result of all those little white calcareous points in the young cranium of the human embryo, we might conceive, before careful and repeated examination, that they were accidental points, become consolidated by the deposition of calcareous matter, and that there would be no uniformity in their arrangement betwixt any two individuals. We find that the long bones, and all the bones which have numerous processes, begin by detached points or spiculæ, and that all the skeleton in fact begins, not by the elaboration of one bone and then the production of the bone next to it, but that the process commences in various detached points of the gelatinous skeleton, like the spicula in a poriferous animal, or in the fleshy crust of a gorgonia, or on the back of an asterias. We know that there is a perfect uniformity and method in the points where the calcareous matter is first deposited in each species, and a constancy in those points; and that even in their anchyloses and union into masses or aggregate bones, there is an extraordinary constancy in each tribe of animals. This we can perceive in the human skeleton and in all the higher animals; and, in fact, we can perceive it in watching the development of the skeletons of the animals we have been just considering; for the particles that are strewed through the body of zoophytes and poriferous animals and radiated animals, when watched ultimately through their stages of development, are found to have all a perfect method in their arrangement, which we only discover when the whole is completed. The importance of that is now well known to the anatomist, and we shall have to apply this fact hereafter to the explanation of some curious phenomena in the osteology of quadrupeds and other vertebrated classes. In the human skeleton we see that the points which begin at detached centres meet and unite. We find in the vertebræ that there are certain fixed elements, or centres of ossification in the vertebrated animals, and that these can be traced through the cranial vertebræ; that there is a method in the connexion of those elements to form single bones; that the four pieces of the occipital bone unite together, though at first detached; and that those four pieces of the occipital bone, the four portions or elements of the first cranial vertebra, unite together to form one bone, although they do not unite and anchylose with the parietal and temporal bones in contact with them. We know that there is a method in their mode of grouping together, and in the department of comparative anatomy these are not mere centres of ossification, but separate bones; and thus we shall have occasion to speak of the basilar bone, the condyloid bones, and so forth, uniting in the skeleton of higher animals to form one bone. For instance, the frontal bone is an aggregate of several bones; the sphenoid, the temporal, are aggregates of many bones; and if we were not aware of the way in which this takes place, we should be perplexed with the skeletons of fishes where these elements remain permanently detached; we might look at the skeletons of fishes, and of all the lower tribes of cold-blooded vertebrated animals, as heterogeneous aggregates of ossified pieces diffused indiscriminately throughout the body; and in speaking of the bones of fishes we should be induced to use such vague terms as *ossicula musculorum*. These observations occur to us thus early, from the unity of plan we already begin to discover in the structure of the skeleton, but they will be explained more in detail hereafter, when we come to examine the skeleton of vertebrated animals.

To-morrow I shall proceed to the skeleton of articulated animals.

I will mention a circumstance which may not be uninteresting to you, as some of you have asked me respecting books which you might consult for the purpose of following (in your private studies and readings) the order in which I am treating these various subjects, so as to make yourselves more familiar with the facts I am detailing. I have generally candidly confessed to you, that I do not know any such books,—that certainly in our language there do not exist such works, and, indeed, with regard to some of the subjects which I have already discussed, I do not know any books in existence which have the details of those facts. I have myself published various memoirs in different journals touching them; but even in the systematic works now publishing on the continent,—by persons in countries more enlightened in these studies than ourselves,—they are still not made the subjects of detailed examination; they have not yet got such footing as to be regarded as a part of that knowledge which we may consider the common property of the science. I have generally recommended my

pupils to observe the books I should have occasion to quote or to cite when speaking of the subjects to be treated of by me, such as those of MULLER, GLEICHEN, and EHRENBERG, already cited, which I shall frequently have occasion to quote, in speaking of the organization of the animalcules; those of ELLIS, of CAVOLINI, and of ESHER, in speaking of the zoophytes; in speaking of the radiated animals, the works of DELLE CHIAJE, of ESCHHOLTZ, and of TIEDEMANN, and others.

I have also generally recommended to the pupils to take notes during the lectures, which would facilitate the recollection, when we had passed on to very different subjects out of the points we had discussed in earlier parts of the course, particularly in consequence of the competition for prizes that takes place at the end of the session. I am happy, however, to inform you, that I have confidence that fuller notes will be taken of this course, and upon the plan which I am now following, than I am persuaded you can take or have had access to in any former year. I have had ocular evidence (by receiving a proof of one of my own lectures to correct for the press) that Mr. WAKLEY, the indefatigable and learned editor of a publication familiar to you all,—THE LANCET,—which has had great influence in our profession, keeping our professional brethren constantly awake to all their doings—a castigator of evil-doers, and a rewarder of the good—that he has determined that comparative anatomy shall occupy a part of his two ensuing volumes, and that he has selected, as the course of comparative anatomy which he will take on the present occasion, the one delivered in this institution. This I look upon more as another instance of kind attention, I would almost say of partiality, towards this great medical school, than as a proof of any peculiar excellence in the course given here. He began on Saturday with the commencement of this course, and I understand that he has an intention to go on regularly with the lectures to the end of the course, and that he will have, weekly, perhaps one, or it may be two, lectures, so that the whole course, consisting of about sixty lectures, may be embraced within the two volumes which he is just commencing.

ANATOMY AND PHYSIOLOGY.

LECTURES
ON THE
HUNTERIAN PREPARATIONS
IN THE MUSEUM OF THE ROYAL COLLEGE OF SURGEONS, LONDON.

Delivered at the College in 1833, *by*

SIR CHARLES BELL, K.G.H., F.R.S.

LECTURE I.

OBJECTS OF THE COURSE.

I FEAR, Sir, it is not possible for me to acquit myself with satisfaction in the presence of many gentlemen whom I see, and who are deeply learned in the subject on which I have to discourse,—some, too, who have enjoyed literary leisure, and the still greater advantages of a college life, who must have acquired a high degree of sensibility to all the errors of such an unpremeditated discourse as that I am about to deliver.

But I must appeal to the members of my profession,—I must call upon them to recollect how difficult it is for them to keep up the knowledge which they have acquired during the time of their general studies, in the intervals of an anxious profession; though they must sustain their condition in society, their relation in their profession, by a continual attention to the labours and the practice of that profession. So, too, must I, and, therefore, I am sure, that from them I shall obtain the excuse I need—I mean for the language I may employ; for I make no apology for the matter, further than this, that I do assure you, as the only compliment I can pay you, that I have taken every interval,—that I have devoted every possible portion of time,—to prepare myself for coming before you.

Gentlemen, these lectures must not strictly be designated "Lectures on Comparative Anatomy." I can demonstrate to you at this moment, that such a course of lectures as that, it is not possible for me to give. For were I to call for those things which are necessary even to a course on comparative anatomy, I should soon be disappointed. I should be sorry to call for them, because my excellent friend here *(turning to* Mr. CLIFT) would come with continual apologies for the want of them. Now I mention this, not by way of apology for myself, but to show you at once that I have a distinct well-marked path before me,—as if a finger-post were

erected. I have to go along the gallery of the museum of this college, and to place before you from thence the preparations of Mr. HUNTER, and to endeavour to follow, in my lectures, the course he took in preparation of them.

Now we must never forget that HUNTER was not a *comparative* anatomist, nor merely an *anatomist*, but that he used those portions of knowledge which were furnished him by a study of the whole animal kingdom, as the means of arriving at something further,—of carrying him on to a knowledge of the functions of the human body. And not even stopping there, but having the ulterior object in view of elucidating the *pathology* of the human body. Therefore, instead of dilating merely, as men of leisure might do, on *comparative anatomy* or *natural history*, we are to follow the great example which HUNTER has set us; for I conceive that I am chiefly to be useful in these lectures by pointing out to young men *what* Mr. HUNTER did, and *how* he did it.

I feel some delicacy in speaking of Mr. HUNTER after the admirable oration you have so lately heard;* but I will beg you to recollect, that there are many present who did not hear that oration, and I believe that there are many here who do not know JOHN HUNTER and WILLIAM HUNTER as they ought to do. I entreat you, therefore, to give me your attention while I speak to the junior members.

Now there is a fault, an error, a misconception, arising from an imperfect knowledge of HUNTER, his life, and his actions. We continually hear it said that young men need not read books, because HUNTER never did. There can be no greater fallacy, no greater mistake, than this. Let us understand the true meaning of the remark, that "HUNTER never read." It must be acknowledged, that during the early period of Mr. HUNTER's life, he was idle. He had the misfortune to lose his father early. His elder brother was engaged in his profession, and JOHN HUNTER himself lived in a remote county with his mother and aunt, and, in the words of domestic reprimand, he was "a bad boy." He would learn nothing. I could put my hand on a letter of an old friend of the family, who sufficiently describes this fact in a few words. He was a neglected, indulged, boy, and, in short, it was not until ripened and manly feelings took possession of him, that he began to understand the great character of his brother, the example of whom was, with words of affectionate kindness, continually pressed on him. He delighted to think of what Dr. W. HUNTER was doing, and then with rising energies resolved to win the esteem of that brother, that he might join him.

Now, Gentlemen, unless we consider who that brother was, the whole course of Mr. HUNTER's life was a miracle. We should consider who Dr. HUNTER was. I know you have learned that, from your various lecturers, but you may not be aware that you are indebted in a great measure for the lectures they give you, and for the regularity and systematic course that obtains throughout this city, to Dr. HUNTER. Before his time no such thing as "lectures" were given at all. When he had once set a pattern, other persons imitated him, and the nearer the imitation, the greater their elevation in the profession became. When the younger brother joined the elder, the latter had obtained a high reputation. It is particularly necessary that the junior members should observe how Dr. HUNTER advanced; for had he not so advanced, we should never have heard of JOHN HUNTER. His elevation was the effect of education. He was highly educated, and had the farther merit of having educated himself. He was a man of genius, but his mental powers were not shown so strongly as those of the younger brother. He possessed much elegance of deportment, and an insinuating address, and was the most eloquent lecturer that ever addressed students. He had a noble collection of anatomical preparations, a princely collection of gems, and the finest collection of coins in Europe. All this he possessed, and had employed, before JOHN HUNTER joined him. Therefore, instead of supposing that JOHN HUNTER began as an ignorant man, you must recollect that he was in reality a student in the dissecting-room of his brother, having the advantage of his brother's admirable museum, his conversation, his tuition both in private and in public, the advantage of the company of men who came to visit Dr. HUNTER and his museum from all parts of Europe, every man of distinction and eminence doing so. Such was the society in which JOHN HUNTER was placed, and such was the source of all his eminence. He began, in fact, to work for himself on the excellent basis of his brother's labours. If, therefore, you reflect on the example of JOHN HUNTER, you will do well to consider the character of them both; for, unaided by such advantages as the elder brother afforded, there can be no hope of imitating the younger brother.

But, no doubt, Gentlemen, JOHN HUNTER possessed that which is above all comment—*genius*; and mark how that

* Alluding to the Hunterian oration.

genius was developed in him, as it ever has been in men who have been great in their day; it was by perseverance. He was a man possessed of a strength of mind and an integrity which enabled him clearly to see what was right, honourable, and important for him to do in his time, and, thus influenced, he kept his objects steadily before him, pursued them uninterruptedly, and so you find, that whether JOHN HUNTER was in the dissecting-room of his brother, or in the theatre, or in private, or in public, or abroad with the army, or in the field, he never forgot the main object of his life. This is the only explanation I can give you of the accumulation of the extraordinary collection here before you.

Now in the museum there is collected much more than many yet know has any existence. It is notorious that great men on the Continent are not aware of its treasures: and perhaps you will feel with me, that there are many at home who ought to be acquainted with its contents, but who, notwithstanding, do not know it. Formerly my friend here (Mr. Clift) was wont to make continued lamentation over the alleged "discoveries" which were made abroad, which, to those who have studied this museum, were no discoveries at all; and Mr. OWEN, who is still curator of the museum, knows full well at this moment, that every day there are dissertations written and sent over from abroad, which betray the utmost ignorance of what has been done by Mr. HUNTER. Now who is to blame? We are, I fear, all to blame; we have not sufficiently explored the treasure which is in our keeping. There is one observation which I hope will appear to you to be natural at this point of the lecture, and not to notice it would almost be as bad as if I were afraid to do so. The HUNTERS came forward without patronage, unaided, and raised themselves by their own exertions out of the mass of this great Babylon. Can it be doubted, that the difficulties with which they had to contend in the early part of their lives, gave them strength to accomplish that which characterised them in maturity? It is a fair question, and there is no tribunal better entitled to determine the question than the one which I have the honour of addressing, viz.,—whether the old method was better than that of the present day; whether men should assume to themselves the power of of establishing scientific institutions; or whether professors should be appointed by a tribunal to the situations for which they are best adapted. I pretend not to say which is the best, but I have placed before you the HUNTERS, and I may mention them as examples of the old method. It remains to be proved what is to be the result of the new.

Gentlemen, I said that the course before me was as clear as if there had been a finger-post at its commencement; I must begin, then, with the left hand of the gallery, where there are preparations explanatory of the structure of bone. Now before entering upon a full examination of these, there are some previous questions to be discussed. You will observe, that there is something common to all animals, something common to those in whom all the functions are common. Last year I dwelt long upon this point,—that as certainly as the phenomena of life were exhibited, so surely was there a motion in the animal matter evincing life; not a motion of the exterior of the body, or of the extremities; no, nor an intestinal motion, but each minute particle of the living body in such case exhibits change, and a change which is rapid in proportion to the degree of vitality. The minute particles of the living frame, then, undergo a continual revolution,—a perpetual deposition and absorption. This faculty of motion in the minute particles of the animal frame is characteristic of the existence of life, and continues from the first beat of the pulse to the moment of death. Now this internal and minute motion is produced through the influence of distinct organization and distinct functions, and every animal, from the most minute, or, as naturalists say, "the most simple" upwards, has certain functions,—an appetite, digestion, assimilation, the conversion of dead matter into living matter, a circulation to carry the assimilated matter into union with every part of the body; decarbonization, by means of respiration. These functions are necessary to that internal and minute motion which characterises life in the particles of the living frame. You see, then, how this affects the question of "simple" or "complex" animals,—for some will speak of certain animals by the denomination of "simple;" the greater wonder, however, it is that these distinct functions should be performed in organs that are distinct. But I am to show, that though these great functions be the same in all animals, there is an extraordinary adaptation of their organization, and that that organization not only exhibits design, but a prospective design. You will observe in reading on this subject (which no doubt you will do), that men of high character in this department of knowledge, hold strange theories and hypotheses respecting it, and one of them is, that all the varieties we see in the animal kingdom result from the influence and operation of

things which are external,—from the elements around the animal, and that such, in fact, is the case with every degree of structural variety which you see. It is strange that this notion should be entertained by any man who studies animals. You might expect it to be the opinion of those who look only at the surface. We see the hand, or some external instrument, attached to the animal, without being aware of a hundredth part of the functions which are necessarily consequent upon its formation. The hand, for example, is not merely a part attached to the body, but it possesses muscles and nerves, and has a relation to the brain, and there is a determination, an influence exercised, in order to put this outward instrument into motion. To say that we see the root of the plant shooting to the earth, to say that we see the flower of the plant turning to the sun,—if we reflect on these in connexion, not with present time, but with the old time which existed before the creation of man,—that great period of mysterious length, which existed before the creation of human beings, or previous to the present condition of the surface of the globe—there is no saying, so to speak, what may have been the effects of such long intervals, but the structural circumstances show that things have been formed with a prospective design, and are not simply the result of events which extend only to the time which was present at their formation. Now I will take an example from the highest link, as they term it, of animal existence, or, if you will, the lowest link, to descend from man to an insect. I take the double condition in which man is viewed by physiologists, that of the fœtus and that of the adult. What is more extraordinary than the progression from the one to the other? Observe the form of the child at birth. That form is totally unlike the adult state. You know that the peculiar form which distinguishes the fœtus is positively and absolutely necessary to its safety at birth. In order to ensure that safety, you see the frame grows in a particular manner up to the period of birth, which has no sooner taken place than another form is assumed, and upon that model man is constructed. Now you do not merely see in the form of the fœtus, before any external influence can have operated, a provision for birth, but you discover in it phenomena of life; for the child in the womb has a life suited to the period of gestation: but when that period has arrived, it dies as effectually as if a creature that breathed were put under water. Here is a large preparation illustrating this subject. You see here a fœtus at the full time; I believe I should call this a child of a full period—an extra-uterine child. Now the extra-uterine fœtus lives up to the period of nine months. I do not consider it my duty to go round the gallery and notice everything, but occasionally to bring out preparations which are in the body of the museum, that you may fully appreciate its value. Well, then, here is a child fully grown, an extra-uterine fœtus. Now if a woman have a tumour, there is no limit to that tumour. It goes on increasing until it takes life by destroying the powers of life, or drawing too plentifully upon the fluids of the mother. But at the period at which birth should take place, a convulsion is produced, and the child dies. Why does it die? Because there is a provision, not only in all the internal organs, in the heart, in the lungs, in the vessels, but in the life of the fœtus. It is provided, that at a certain period the manner of that life should be changed, and if it be not changed at the appointed time, the fœtus dies. You see here, then, a clear prospective provision, that, at a certain period, a certain change shall take place, after the structure of the fœtus is formed.

I stated that we might take an example from the lower invertebrate animals. You may take the simple fly, the larva creeping at the bottom of a pool. Now, anticipate its period, take it up, and dissect it; you find its wings folded up curiously, you find them supplied with muscles, the muscles with nerves, the nerves with a source of energy. Nothing of the kind has as yet been put into use, but these things are prospective of the condition which the animal is to assume. The simple question is—"Are there any simple animals?" To be sure there are. And has a great length of time wrought this change in simple animals? No, on the contrary, be assured that the deeper you probe this subject, the more you will be convinced of the adaptation of every thing to a design—as I said in the beginning—to a prospective design.

There is another notion, which is a painful one, and which one would like to discard. It is the notion that nature is feeble on her first efforts, and that she acquires power during the progressive formation of different animals, so that at length, by practice, as it were, perfection is acquired; yet it is attempted to establish this position on some very curious facts. In order to support it, however, there must be an established relation observed between the condition of the crust of the earth, and the animals which inhabit it. Now, it is perfectly well known that the stratification of the earth's surface exhibits a variety of appearances. Low down in the

strata you find something which, as it were, implies chemical composition. Above it you find a firmer degree of rock, or a state of surface of the world distinguished by strata. Having observed a succession of these strata, the mouldering down of rocks, you find in them animal remains, which, as naturalists term it, are the lowest in organization (which I do not deny) of all animals,—the *mollusca*. Above this stratification we find bones which denote the existence of the vertebrata—the existence of an animal of an altogether different system still (as it is deemed) more perfect. But these vertebrata consist of oviparous reptiles, and are considered the lowest scale of animal existence. In the stratification above this we find the mammalia, and above that again the larger animals, the elephant, the megatherium, the mastodon, and, finally, in the top dressing of all—if I might so express it—and in those only, are found the remains of man; and it is universally believed that man was created after the last grand change upon the surface of the earth.

Now an opinion which has been formed by many naturalists is this, that these lower animals were created at a period in which the power of the Creator, so to speak, was feeble;—that it acquired strength, and that at length the complicated texture and high endowments which distinguish man, were given to human beings. Now, Gentlemen, the objection that I have to this is simple enough—viz. that the creation of a living power, and the junction or union of that living power with an organised body, present such an incomprehensible exertion of power, that it is ridiculous to say that an additional bone, or an additional muscle, or an additional organ of sense, indicates a higher power.

In the approximation of the animal condition to the lower strata, there is one more question which arises. Has there been any interference in this with the regular code of nature? Before, however, we can enter upon this question, we must remember that it is part of our nature, as reasonable creatures, to entertain certain mental impressions relative to the permanency and regularity of events, without which we should have nothing to reason on. All would be doubt and uncertainty. But if we may presume to go so far into the course of nature—I mean into the conviction of those changes which have taken place in the globe itself, with the corresponding changes which we observe to have taken place in animal structure, I will say that there must have been this interruption; for, in studying nature, you will see that there must have been distinct creations, corresponding with the several conditions of the globe; and I hold that this conclusion is good, not only from finding that every animal which is immersed in the stratification, presents an appropriate relation to the state of the surface—indicated not only by the condition of the rock itself, geologically considered, but by that of the animal itself, and you find the relation progressively occupied with what are still termed the "imperfect" animals up to the more perfect. In short, if you examine yourselves, if you consider your condition, if you examine every turn in your journey, how much is shut out from your view; or if you consider that journey, contemplate it, watch it long, still waiting for the light of day, I shall be surprised if you do not discover a certain correspondence in your own mind, faculties, and organs, with everything that is around you, from the first dawn of morning until the whole landscape is brightened by the sun shining on the vales, the woods, and the water. You will discover, I think, that there is a relation between the mind, the organs depending on the mind, and the whole of external created nature,—that there is a correspondence between the constitution of man, his powers of mind and exercises, and, above all, his enjoyments. The same may be observed in all links and connexions of nature, down to the lowest stratification in the crust of the globe. It is by pursuing these views much farther, that I hope you will arrive at a knowledge of the acts of your own mind,—to the conclusion that there is a relation established between everything, a correspondence, a design, and, beyond all, a prospective design.

Now, Gentlemen, to enter upon the subject of structure. The first thing we come to is bone. Last year I dwelt long, perhaps tediously, upon this fact—that man and all animals bear a peculiar relation to the globe on which we stand; and, if you recollect, I illustrated this position by reference to a piece of machinery. I stated to you that a machine of the simplest construction for raising a weight, is said to multiply the powers of the hand, and I represented to you,—as saying that we did not comprehend how the powers of the hand could be multiplied. If you go into this inquiry, you will find that the power of the hand is not multiplied, and that the machinery for moving heavy weights has no power at all, unless it be screwed to a rock which is fixed to the ground; for it is from the resistance which is afforded at this point of fixation, that an addition is made to the power of the hand,

and that we are enabled to raise a great weight. If you take a simple lever (for all the wheels and complex parts of a machine are but various forms of lever), you will find that it has no power unless there be a fulcrum or point on which it can be rested. Now the point of resistance gives it a power apportioned to the strength of that resistance. Now every limb in the human body is a machine. It is not enough that the limbs have got bones, muscles, and nerves to move them. How is this human machine fixed? for unless it be fixed, it can be no machine. But it *is* fixed, and it is fixed by the weight of the body, and if you were to pursue this subject, you would find that the body bears the same relation to the globe on which we stand, that the lever of a machine does to its fulcrum or resting point. At first sight this may seem extravagant; the fact is, however, that the weight of the body corresponds with the attractive power of the earth upon that body, and if you fix this fact in your mind, (and it is an undoubted fact,) you will not be surprised at the statement that the animal body bears a relation to the whole globe.

This brings us to the subject with which we started. The bones of animals must have a point of resistance—they must resist external impulse. The functions of assimilation, circulation, absorption, and respiration, are performed by organs which must be united together, and yet possess a strong means of resistance against each other. To be sure in the medusa, and such animals as are floating in the water, you do not need all this texture of bone; common cellular texture is sufficient in these instances, because the animal is buoyant: but if it were to remain out of the water, and rest upon particular points, or upon an extremity, that extremity must have a power of resistance proportioned to the animal or muscular power contained within: and, in fact, you will find that throughout the whole of nature there is such a provision as this for each animal.

I ought to mention that this is an idea of Mr. Hunter's. In the specimen which I now show you, there is no interior bone, but there is a provision for the protection of the animal. In the specimens which are now before you, you have two conditions of this earthy matter, one internal, one like a shell to protect the other, as in common coral. There is, in the skeleton, a column, and that column is requisite to ensure the existence of the exterior delicate animal texture. Now such you will find to be the case in all creatures. Take the larva of an insect,—one of these animals. What is there here? observe that this is the language of Mr. Hunter. It is what he tells you. Each of these bottles presents to our notice a fact. The arrangement of these bottles therefore becomes most important, and it is therefore most important that you should retain a knowledge of the principles and arrangement of Mr Hunter, because they constitute a language. They are Hunter's thoughts, and the arrangement of them forms a universal language. It is clear that he meant to say, that even in the lower animals, there must be some crust, some protection for the animal, some outward deposit which should give them the power of that resistance. You find this fact to be universal. Why? The animals could not move without it. Hence those animals which have the hardening material in a series of rings, have attached to these rings a succession of muscle by means of which they use them. It is with this view then that I present to you the larva of the fly which fixes on the willow. Now, Gentlemen, you have read, I doubt not, with great admiration, the large and beautiful volume of Albinus, and the fine quarto dissertation that accompanies it; but as fine a work, as elegant a work, in all its parts, has been published on the muscles of this animal, the willow caterpillar.* You will find that these rings give the animal the power of resistance. They consist of depositions of hard materials. They are one upon another, and admit of motion. Take off these rings, and you will find muscles running along the whole extent of the animals. I am anxious to show what Mr. Hunter had in his mind. Here is a preparation exhibiting that which others have dwelt upon with so much interest. Take off this general muscle, and you find that other layers are beneath it. Then take off those layers, and you find others still beneath them. You are not entitled to suppose that these are accidental arrangements. Do not presume, that because they are minute, they are accidental. There are 500 muscles attached to this hard ring, which passes round the animal, each muscle having its nerve, which I notice just to bring to your recollection that each nerve has its source of energy. Now, if I take this opportunity of making a comparison, let me ask whether there be any part of man which presents a complication equal to this. There are the powers of the hand and the action of the muscles, but the source is from the brain, the circulation of the heart, the organization of the lungs. Is that member simpler or more complex than is the structure of this animal? Here is a breathing tube along the whole of this animal. Take each portion of it. There

* Lionet enumerates 2000 pairs of muscles belonging to this caterpillar.

is a distinct trachea with each portion, a distinct heart with each portion, new, digestive, and respiratory organs with each portion. Now looking at these inferior animals, are we entitled to consider them as deficient in organization,—as early attempts of the Creator?

But if you take the larva of an insect, and observe its degree of perfection, you will still find the same matters or circumstances which I have mentioned, though with a beautiful variety of structure. It is for this purpose that I show you this sketch of the leg of a beetle. This subject is connected with the bone of the animal now under my hand. When you have passed many years in the study of osteology, you acquire a notion that bones are the perfection of animal structure. But this is by no means the fact. If it were to constitute the internal skeleton for the external skeleton, the articulation of the internal skeleton must be deficient upon the principle of mechanics. It is a familiar fact, that when the matter of bone is removed the transverse fracture is morbific. You do not need that I should now make that demonstration to you; but if mechanical strength be increased in proportion as the matter of bone is distant from the centre of the whole animal, the perfection of strength is accomplished in the insect, for the bone is external.

Then, again, bone must be part of the living frame; for you well know that it must be absorbed, that it must be deposited, that it must undergo all the changes which belong to a living part. Therefore it must have vessels, it must be porous. But in external shell, in the external bone which protects an insect, the substance may be very dense, because there is no condition implying the necessity of change by means of the operation of arteries and veins, so that compared with bone it is firmer in mechanical structure, and better, as it were, in its intimate substance. We go beyond this, Gentlemen. Be assured, that there is always a correspondence between the animal, the muscular power, and the resistance. You may observe it in the bones of man, and in the bones of race-horses as compared with draught-horses; or you may observe in insects that the texture, the firmness of the scales, acting as bone, is indicative of muscular strength. Indeed the muscular strength of insects has been notorious since the time that certain wags cast ridicule upon SOCRATES for watching the strength of an insect. That philosopher knew, and every one else knows, that the muscles of these animals possess an extraordinary degree of strength. No wonder that it should be so when you observe their apparent complication, for it is no more than *apparent* that there is no complication. Thus we find that in the covering of insects in the articulati, if you notice they are finely articulated; the processes in the thigh-bone of man are not more regular, nor more curiously exact, nor so much so, as are these inwardly-projecting processes. Here is the external bone, the processes passing within which may be considered as the thigh-bone, and the shell projecting outwards may be considered as the tibia and fibula—in that covering, as I said, there is a great mechanical advantage from the attachment of the minute muscles.

Now I state these things, Gentlemen, to show you to what an extent the consideration of the bones of animals may be carried if you contemplate them in all their bearings. If I have formed a correct opinion on this subject, it is, that it will be more advantageous to endeavour to complete one subject than to seek your approbation by passing over many subjects. I have observed, that men of thought and ingenuity are more fatigued —an effect which should be avoided—by contemplating a variety of subjects than by following up one only with great minuteness.

Let me then to-day conclude by observing, that studying these things tends to prepare your minds for other and better avocations. I say again, that natural history or comparative anatomy is but the means of preparing you for other branches of the profession. Now it is acknowledged, that on many subjects, mathematics is an excellent study for strengthening the mind and acquiring the power of concentrating the mental faculties on any subject; but that will not serve our purpose. Your business is to observe the phenomena of life, and there can be no better way of preparing your mind to observe facts, and to follow them up by exact reasonings, than by taking the method which our great authority HUNTER has done before us. It is by following up comparative anatomy and natural history that we discover the importance of the human structure, and thus impart a dignity to our engagements, by making every effort tend to the alleviation of human suffering.

CLINICAL LECTURES

ON

DISEASES OF THE UTERUS AND ITS APPENDAGES;

NOW DELIVERING IN PARIS,

By M. LISFRANC.

OF THE TOUCHER.

The general rules for examining the state of the female genital organs by the touch, are sufficiently well known; most commonly we make our examination with the index-finger of the right-hand, moistened with some oily or mucilaginous substance. The finger passes first along the perineum, and is then made to enter the orifice of the vagina near its posterior commissure, in order to avoid touching the clitoris.

Such is a brief description of the common method, but a great many points of some importance have either been forgotten or neglected by those who have described the mode of practising the toucher. Thus, it is by no means indifferent whether we moisten the finger with oil, butter, or cerate, especially if the toucher precedes the application of the speculum. Cerate obscures the parts, and butter often sticks upon the parietes in such a manner, that it may be mistaken afterwards for some morbid secretion; oil, therefore, is in all cases preferable. In some females the nut of the uterus is situate so high up, that the finger can reach it with great difficulty. This peculiarly occurs in fat women, where the labia are excessively developed; in this case it is useful to place the woman on an inclined plane of from 25 to 30°, as in the operation for the stone, or on the edge of a bed, the legs widely separated, and the feet supported by a chair. The surgeon must separate with care the labia majora, in order that the hand may arrive directly at the opening of the vagina; by this means we gain at least an inch. In these cases, also, we should be careful to employ the general rule of placing the thumb between the great lips, and the three last fingers extended and separated from the index, between the thighs and against the perineum, which the medius may, in case of necessity, push up a little; at the same time we desire the woman to force down, and we endeavour to depress the uterus with the left-hand applied to the abdomen above the pubes. Sometimes it is necessary to make the woman walk about for an hour or two before touching her. In this way I succeeded in bringing down the uterus of a female in the ward of St. Augustin, who had a polypus attached to the neck of the uterus: before using this precaution, I could not reach the pedicle at all.

In more difficult cases it may be well to introduce the medius and index fingers together; here the whole hand may be introduced, for the vagina will yield sufficiently to admit it, though the woman be not pregnant, or near the time of labour; but this requires great slowness and management, and the observance of the rules which belong more properly to the introduction of the speculum; we may hence, however, remark, that abstracting the difficulty of its introduction, exploration with the whole hand is more easy, and leads to more certain results than do one or two fingers.

In the common toucher we should always be careful to examine the whole length of the vagina, as the finger continues to penetrate, describing with its point various arches of a circle. I well remember having to repent the omission of this rule some six years ago, in the case of a woman whom I touched frequently, without perceiving a polypus of the size of a nut, which grew from the posterior and middle part of the vagina. In some scrofulous women, when we press the finger backwards, or on the sides of the vagina, we sometimes feel a crepitation produced by gorged or inflamed lymphatic glands, which give rise to certain accidents analogous to some affections of the vagina or uterus; it is sufficient to point out this error, to prevent you from falling into it.

But it is especially the examination of the neck and body of the uterus which requires great dexterity and a perfect knowledge of this organ; and in the first place, if it be necessary to examine the whole circumference of the neck, it is essential to touch with both hands; for the pulp of one index-finger can touch and examine the vagina and neck of the uterus in that surface only which is opposed to it. To examine the whole circumference with one finger, would require that the arm execute a complete rotation, which is impossible. The neck of the uterus presents a great number of varieties, not only in different women, but in the same women at different periods, and we can readily conceive how important it is not to confound these natural varieties with a diseased state of the organ.

It would be impossible for me to point out to you all their varieties; long practice on the living, and examination of the

dead body, will teach you more than any description can do; however, a few considerations on the subject may be useful. At the period of the menses, and even a few days later, the neck of the uterus is more soft and voluminous than natural, and gives the same sensation to the touch as at the second month of pregnancy; the same state is observed after frequent sexual intercourse. During the menses, the orifice of the neck is also dilatable, and admits readily the first phalanx of the finger, which, when introduced thus far, feels a smooth tissue, like a serous membrane.

Hence, in these cases, our conclusions should be very guarded; at any other period the dilatation of the neck indicates some present or imminent malady of a severe kind. If the finger, instead of meeting a polished membrane, feels one which gives a sensation similar to that when we touch a mucous surface, there is certainly something wrong. The neck is also dilated during hemorrhage, or when the uterus contains a polypus; but then we have other symptoms to assist the diagnosis. In some women the neck naturally resembles an elongated cone, with the apex inferior, presenting a round orifice, as if it were made with a gimblet. Its length is very variable, and may extend even to an inch and a half; hence, the indications drawn by accoucheurs from the effacement of the neck of the uterus at different periods of pregnancy, are subject to numerous exceptions.

We should also avoid mistaking for a diseased state, those cicatrices which result from slight laceration of the neck during labour; they are hard, linear, and give the sensation to the finger of a small thick plate, on the edges of which the two lips of the wound are united. Finally, in old women the neck of the uterus becomes more contracted and wasted even than the uterus itself. The vagina becomes equally contracted round the os tincæ, and almost forms there a cul de sac. In other cases the neck projects either forwards or backwards, without there being any trace of disease, which we are not to conclude, unless there be present at the same time tumefaction and sensibility. Thus, women who are accustomed to receive men frequently, have the neck always pushed backwards, with a slight interversion of the uterus; this arises from the circumstance, that during copulation the glans lodges in front of the neck, and pushes it back. Besides, you all know, that when an obliquity of the neck presents an obstacle to the touch, the neck of the uterus may always be brought into a more favourable direction by changing the position of the woman.

Other precautions are necessary when we wish to explore the body of the uterus. Some anatomists have erroneously believed, that the superior part of the vagina is as narrow as the inferior. M. Cruveilhier has shown that its capacity is truly astonishing. This fact is important in the history of the toucher. In fact, if we confine ourselves to simply pushing the finger from below upwards, it soon reaches the attachment of the vagina round the neck, and exploration of the body of the uterus becomes impossible; but the capacity of the vagina at this part permits us to push up its parietes sufficiently high to examine, in most cases, the lower half of the body of the uterus. In the vaginal toucher we may also gain that by the rectum and hypogastrium.

To practise the toucher by the rectum requires long experience; the womb, which we feel through the recto-vaginal parietes, appears of an enormous magnitude, to which we should be accustomed in order to appreciate its just value; by this means we may reach as high as the middle of the uterus; but it is most applicable to an examination of the broad ligaments, which are touched with the greatest facility across the parietes of the intestine.

The volume of the body of the uterus is just as variable as that of its neck; but we may conceive how necessary it is to judge correctly on this point, when we reflect that a slight difference of volume may contra-indicate an operation otherwise necessary. In general every irritation in the neighbourhood of the uterus attracts the blood to this organ, and always increases its size more or less, particularly any affection of the neck. Ventral pregnancy will cause it to swell one-third.

I have said the womb wastes in old age; if, then, at this period of life the neck should require an operation, should the uterus seem more developed than in an adult, it is a sign of too great engorgement, and an indication for deferring the operation. The position of the uterus often changes, without our being well able to assign the cause of this change. In women who have borne children it is lower in the pelvis; in women who cohabit much, it is inclined forwards; and as for more considerable displacements, of which most practitioners have made an essential disease, I consider them in general as a simple symptom of engorgement, and I have as yet found no reason for changing my opinion.

It may be well to remark now, that

some women, especially those who come from the country, have the genital organs, though healthy, so excessively sensitive, that the least touch determines great pain, and even convulsive attacks. Bleeding, baths, opiate glysters, &c., are necessary to calm this state of irritability.

ON THE APPLICATION OF THE SPECULUM.

When we wish to judge simply of the size, consistency, or sensibility of the neck of the uterus, the finger is, without doubt, sufficient; but we must have recourse to the speculum in order to recognise the existence of excoriation, miliary eruption, or the nature and extent of various ulcers. I prefer the conical tin tube to all others; but as the ordinary length of five inches is not sufficient for all women, I have increased the length to seven, and have rejected the handle as useless.

Before we describe the method of introducing this instrument, it may be useful to say a few words on the surgical anatomy of the parts. In women who have not had children, the external orifice is not placed exactly in the same direction as the vagina; the posterior demi-circumference is formed by a transverse slip of skin and mucous membrane, called the fourchette. This fold, of various sizes, but always large in proportion to the distance between the anus and vulva, forms above and behind it a small cul de sac. From this disposition it follows, that if we at once attempt to introduce the speculum in the direction of the vagina, we push against this fold of membrane, cause great pain to the women, and fail.

It is necessary, then, to commence by directing the instrument backwards and a little downwards, in a line drawn from the orifice of the vulva to the point of the coccyx, and, when we touch the bottom of this cul de sac, to raise the instrument into the direction of the vagina. The dimensions of this orifice are also very variable; in virgins, it is in part closed by the hymen, which we should respect, unless the indication is very pressing. It is useful to know, that in young girls it is extremely dilatable, more so than in adults. From the moment of the cessation of the menses its rigidity becomes greater and greater; so much so, that, at an advanced age, instead of finding a simple ring which yields to the finger, we find an orifice which is hard, and, as it were, cracking under the least effort made to overcome the resistance; sometimes in these old women it scarcely admits the little-finger, and the vagina presents smooth walls, and a very contracted cavity, instead of its usual folds.

From what I have said we may draw these conclusions, that in young girls, however narrow this orifice may appear, we may expect to dilate it sufficiently;—that in adults we cannot count on this so much, and should not use any speculum much larger than the apparent capacity of the orifice;—finally, in advanced life, we should be very guarded in the use of the instrument, and proceed with great caution and slowness, in order to avoid lacerations, which cicatrise with difficulty, and are caused even by very small speculums. It is the great labia which contribute chiefly to enlarge this orifice and the vagina, as we see during labour, when the head of the fœtus begins to traverse the vulva.

The same thing takes place when any large body is introduced into the vagina; hence the assistant who supports the great labia when the speculum is first applied, should be careful to let them go the moment the instrument begins to enter; without this the parts will be too much dragged, and the vagina not being able to dilate, will oppose the free passage of the speculum.

You may now comprehend more readily the method of introduction. The woman must rest across a bed, supported on its edge, the feet fixed on two chairs, and the legs sufficiently separated to permit the surgeon to place himself between them; a pillow should be placed under the head and another under the pelvis. The instrument should be oiled and warmed, for in winter the coldness of the metal may cause the vagina to contract, and may produce other inconveniences. I have seen one case in which this coldness determined excessive colic, and nearly all the symptoms of peritonitis.

We commence by touching, in order to ascertain with certainty the position of the neck. Without this previous examination, we run the risk of introducing the instrument in a wrong direction, and of being obliged afterwards, in order to find the neck, to execute various movements which irritate and injure the uterus; besides this, the toucher will give some preliminary idea of the volume of the neck, which may direct us in choosing the size of the speculum to be employed. With the left-hand we separate the hair and labia; we take the handle of the instrument in the other, placing the thumb in the cavity of the speculum, and the two first fingers below the handle. The introduction should always take place slowly; if the fourchette extends far backwards, we should avoid any transverse pressure on the perineum, which would only make it more tense; it is even better to draw this part forward.

When the centre of the instrument corresponds exactly with the centre of the vagina, it must be pushed on, first in a line passing from the centre of the orifice to the lower part of the coccyx; and when it has penetrated about an inch in this direction, we make it execute a slight movement of rotation to bring it in the line of the sacro-vertebral angle. As the speculum advances, the woman feels herself compelled to make some involuntary efforts: the vagina presses the speculum on all sides, and presents at the extremity of the instrument a reddish ring formed by the contracted parietes of the vagina, having an orifice in the centre: but if the neck of the uterus is inclined to either side, then the orifice is usually seen on one side or other of this red ring.

This reddish tumour of the vagina, having some resemblance to the neck of the uterus, may lead to an error; but we should remember that the neck does not present any folds like the vagina, and is, besides, of a different colour. In a state of inflammation the neck is more brown than the vagina; in a state of health it is much more pale; however, to remove all doubt, it is well to push up gently the presenting part with a little tube of wood rounded at the tip; when, if it be the vagina, it yields to the least pressure. Sometimes the neck is so much inclined backward, that it cannot be brought into the field of the speculum. In this case the instrument should be drawn back an inch, and the handle raised upwards and forwards, in order to direct its apex between the posterior wall of the vagina and the neck, when this organ may be raised and caught in the orifice of the speculum.

When the neck is too large to be seen at one view, the speculum may be moved from one partto the other, until the whole has been examined, but these manœuvres require that the neck should be completely insensible, otherwise they are not without danger.

When the speculum is well placed, we should introduce into its cavity a small brush, to clean the parts. The neck of the uterus, even in a state of health, is always covered with mucus, more or less thick, which may obscure any small ulcerations. Sometimes its lips, soft and hypertrophied, are applied exactly to one another, and conceal ulcerations of its inner surface; in this case we should raise up the anterior lip with a female sound; this is often sufficient to bring into view certain eating ulcers, or small tubercles situate within the neck, which are the commencement of cellulo-vascular polypi For such examination, if we use the sun-light, the patient should be placed facing the light, and the surgeon must stand on one side; a candle is easily managed by the assistant.

There are certain circumstances which contra-indicate the use of the speculum, or render its introduction more difficult. Sometimes the hymen exists in whole, or in part, and the introduction of the speculum becomes so painful, that it should be absolutely renounced, unless the emergency is very pressing. If, however, there existed some severe disease of the internal organs of generation, it would be preferable to divide the membrane by a crucial incision, and to remove altogether the little flaps, taking care to choose as small an instrument as possible: the same observation applies to old women, on account of the great contraction of the vagina already noticed. Sometimes the vagina is traversed by membranary bands, which impede the passage of the speculum. I once found a circular membrane placed about one inch from the neck of the uterus, which divided the vagina like a diaphragm, and prevented at the same time the application of the toucher and the speculum. More frequently the vagina is contracted in its upper third into a funnel-like tube; and this alteration involves all the membranes; above this contraction it assumes its usual caliber. I have seen this disposition five or six times, and in one case was forced to traverse this narrow passage, in order to cauterise the os tincæ. Finally, in some cases the vagina is the seat of certain tumours, which must be removed if we wish to form a passage for the speculum.

In speaking of the toucher, I mentioned some cases where the vagina was so sensitive, that the pressure of the finger produced the most disagreeable accidents; it is still more necessary to calm this irritation before we use the speculum; the presence of deep ulcerations of the vagina or neck of the uterus, also contra-indicate the use of the speculum: I was witness to a case of this kind, where the unreasonable introduction of this instrument gave rise to an enormous laceration of the vagina, hemorrhage, and death, in two hours. If the neck be surrounded by vegetations of such a magnitude that they cannot be embraced by the speculum, its application is useless. Finally, we should defer the application of this instrument when an extreme hypertrophy of the uterus is accompanied by a state of sub-inflammation of the organ; for as we cannot attempt to cauterise, or apply local treatment to the excoriations or superficial ulcers until the engorgement has nearly totally disappeared, the use of the speculum would be useless, and might be attended with inconveniences.

CÆSAREAN OPERATION.

DEATH.—AUTOPSY.—THE PELVIS WELL FORMED, THE OBSTACLE TO LABOUR BEING OCCASIONED BY

MAL-POSITION OF THE SPINAL COLUMN.

MINOT, a female, 40 years of age, had been pregnant seven times within the last twelve years. Her fifth and sixth pregnancies terminated in abortion within the first three months. The rest had been all more or less difficult, and only one child had been born alive. The application of the forceps had been necessary in each labour; and at the last M. Capuron had been compelled to turn the child and perforate the base of the skull. On the 3rd of February last, being pregnant for the eighth time, M. Bello was called upon to see the woman, whom he found in the eighth month of pregnancy, having suffered for 72 hours from pains in the loins, exactly similar to those which preceded her other labours. When the patient was uncovered, M. Bello found the abdomen of the woman hanging down completely between the thighs, and covering the knees in such a manner, that the umbilicus, which formed the most inferior point of the tumour, touched the thighs when the patient was in the sitting posture. The anterior, or, rather, inferior, surface of the skin covering the abdomen, which was enormously distended, presented a very intense purple redness, with some crusts and slight ulcerations. At the lower part, on the left side, was noticed the trace of an old large cicatrix, and a little higher, near the median line, an actual loss of substance, of the size of a franc piece, produced by sloughing of the abdominal parietes. The bottom of the escharous ulcer was formed by a smooth, thin, transparent membrane, which was recognised to be the peritoneum. The termination of the former labours, the state of the abdominal parietes, and the extreme deviation of the uterus from its natural position, did not leave any hope of the next delivery being terminated without the assistance of art; and it was readily agreed by four physicians who were present, that something should be done before the labour-pains had further reduced the strength of the patient. The application of the forceps was impracticable, because every attempt made to return the uterus to its natural position, and bring the fœtus to the inlet of the pelvis, occasioned the most violent pains, whilst version was judged equally impossible, because the toucher could not discover the os uteri, which seemed more elevated than the fundus. Finally, symphyseotomy, which, besides being little applicable to the peculiar case in question, was excluded by the manner in which the abdomen covered the pelvic arch. The cæsarean operation was therefore, decided on, and performed on the next day, 4th of February, 1833, by M. Baudelocque. A longitudinal incision of five inches in extent was made along the median line of the bottom of the tumour; the first stroke of the bistoury, although carried to the depth of a line, only exposed the uterus, and the operation was finished in sixteen minutes without the patient complaining of the least pain. The infant, extracted alive, was feeble, and imperfectly developed; it lived only for seventeen hours; a very small quantity of blood was lost during the operation, and a fainting fit by which it was succeeded, was attributed to maternal emotion. The patient was replaced in bed, and expired fifteen hours after the operation.

Autopsy eight hours after death. The face and whole cutaneous surface of the body were remarkably pale; the cavity of the pelvis and a part of the abdomen were filled with clots of blood; the uterus, in a moderate state of contraction, also contained some clots. The dimensions of the pelvis were taken with accuracy. The antero-posterior diameter of the inlet was four inches eight lines; the transverse was four inches nine lines; the oblique diameters were four inches four lines. The outlet of the pelvis was not equally well formed; the antero-posterior diameter had four inches two lines; but the transverse diameter was contracted to two inches nine lines.

The disposition of the vertebral column explained perfectly the difficulties of the labour. From the occiput to the sacrum it was perfectly straight, without curve, and was united to the anterior part of the sacrum at a right angle in such a way, that when the woman sat down, the base of sustentation was not formed by the sciatic tuberosities, but by the posterior surface of the sacrum; when she walked, the legs were slightly bent, the trunk was forcibly thrown forwards and to the left side, the shoulders andelbows were carried backwards, and the head was in a forced state of extension, and directed upwards, so that her acquaintances used to compare her manner of walking to that of a stag. This disposition of the vertebral column of necessity threw the abdomen forwards and downwards, and cut the plane of the inlet of the pelvs into two parts, the larger of which gave only a diameter of 2½ inches, and it was, in fact, this diameter

which the fœtus would have had to traverse during labour.

It does not appear that this species of malformation has been before noticed by authors amongst the causes which may render labour either difficult or impossible. The woman attributed her deformity to a fall which she had at the age of 10 years, and to a disease which seemed consequent on it; this affection was in all probability caries of the vertebræ, which had removed the body of one of the lumbar vertebræ, for on examination there were only found four on the anterior surface of the column, though the posterior surface presented five distinct lumbar spinous processes. The patient evidently died of hemorrhage, the occurrence of which M. Bello accounts for, by saying the incision into the uterus was made at the point corresponding with the insertion of the placenta: hence, he concludes it will be proper under similar circumstances to apply the stethoscope before the operation, in order to discover the insertion of the placenta, which may thus be avoided.—(*Transact. Medic. September* 1833.)

CASE OF

ELEPHANTIASIS OF THE SCROTUM,

WEIGHING FIFTY POUNDS, SUCCESSFULLY EXTIRPATED

BY M. CLOT-BEY.

Ali Mahmet, gardener, forty years of age, living for the last twelve years at Alexandria, tall in stature, and of strong constitution, was received into the General Hospital on the 15th of July, 1833, with a tumour of the scrotum, which presented the following characters:—The form of the tumour was oblong and spheroidal, with a broadish base, measuring in circumference forty-four inches from top to bottom, and thirty-nine inches from before backwards; the estimated weight being from forty-five to fifty pounds. The tint of the skin was of an obscure dark-gray brown, altogether characteristic of the disease; here and there some globular granulations varying in size from a small pea to a nut seemed to sprout from its surface; an excoriation on the left side of the raphé of the scrotum gave issue to a small quantity of a colourless and inodorous serum; the tumour was not sensible when pressed lightly, but if the pressure were gradually increased it became intolerable; the patient generally feels a slight sensation of pain, which is continued, but is very feeble. The sound of the tumour is dull on percussion; there is no ballottement or resonance, only a slight shock is transmitted through the swelling, which, joined to the external uniformity of appearance, made it extremely probable that the tumour was of the same nature as those formerly extirpated by M. Clot-Bey. When the growth of the tumour had reached two years, its size was about double that of the scrotum, and up to the twentieth year of the patient's life the progress was progressive, at which time it was fully as large as a young child's head. During the four years which followed the last period indicated, there were alternations of erosion and discharge of serosity, with suppression of the discharge, constantly in the spot before mentioned, which the patient seemed inclined to regard as the point primitively affected. During the fifteen or eighteen years following, its increase was proportionately more rapid; and as the tumour advanced it brought forward with it the integuments of the penis, which was at length completely removed from view, leaving no trace of it except a small linear opening; however, by compressing the tumour, and pushing backward the pubic portion of its covering, the patient could expose the glans penis to the extent of an inch and a half; by this means he was still able to copulate, and had several healthy children by his first and second wives. In the state now described Ali Mahmet, by the advice of M. Clot-Bey, came into the hospital on the 16th of July, to undergo an operation; he was put on an appropriate regimen, and the tumour was removed on the 31st of the same month, in the presence of the principal hospital surgeons of Alexandria. M. Clot announced his intention of operating in a manner totally different from that hitherto used by him. The patient was placed in a position as for the high operation of the stone; two lateral incisions, about six inches long, parallel, and distant from each other five inches, were first made, and then united at right angles by a third incision, stretching horizontally below the orifice through which the urine flowed; by this means that portion of the prepuce, extending from the base of the glans to the extremity of the anormal orifice, was preserved for the length of an inch and a half, and turned back upon the penis. The flap was now dissected off from the penis, and turned away towards the pubes, after having been separated above from the prepuce by a transverse incision; the glans, prepuce, corpora cavernosa, and canal of the urethra, were now exposed in turn rapidly, and the

operator proceeded to seek for and lay bare the spermatic chords and testicles. For this object two lateral incisions were made to circumscribe two similunar flaps, extending from the superior angles of the first flap to the perineum; the spermatic chords were found very deeply situated in the tumour, from which they were separated with great difficulty. The two testicles were also found deeply placed, but healthy; they were likewise dissected away, and held up against the pubes by the hand of an assistant. As there was now no longer any danger of injuring essential parts, the operator proceeded to cut more boldly, and with a few more strokes of the knife removed the whole tumour, taking care to leave the elliptical flaps as envelopes for the testicles. No ligatures were necessary during the course of the operation, and only one was applied to a branch of the pudic artery after it was completed. The two testicles were now covered by the lateral flaps, which were united by several points of suture. The operation lasted about twenty minutes; the weight of the mass removed was fifty pounds; its structure was lardaceous in some parts, very loose in others, and infiltrated with serum. The whole surface of the wound was carefully surrounded by lint, sustained by compresses and a T bandage, and the patient removed to bed. He was in a depressed state after the operation, but the pulse was calm. At eleven o'clock he had some vomiting, throwing up, however, only the anodyne draught given him during the operation. At four o'clock he says he feels well, but the pulse is a little feeble.

Aug. 1. Fever, but passed a quiet night; tongue moist, a little red; in the evening the same state, perhaps fever a little less. *Tartaric lemonade.*

2. Quiet night; pulse calm, but frequent; the dressings are taken off; one suture has given way, and a small gangrenous eschar formed at this point; the suppuration is abundant, and the pubic region is very warm and ballonée; the patient has not had a stool for four days. *Cataplasms to the hypogastric region; laxative clyster.*

3. Has had a copious stool, and passed a quiet night; the eschar has been thrown off without enlarging; the suppuration still continues abundant, but some adhesions have taken place between the edges of the wound.

4. One stool; has passed an excellent night; the pus is of a better kind than before, and the wound is cleaning; the greater part of the sutures came away yesterday evening.

5. Same state; the wound is quite clean, and of a good red colour; the volume of the scrotum much diminished, and the wound is much contracted. From the 5th to the 10th the wound continued to heal rapidly; no further inflammation, except that necessary to adhesion, has set in, and the patient may now be regarded as perfectly cured.

Reflections of M. Clot on the preceding case.

The process adopted in this case differed from that before employed by me, in this, that instead of taking an anterior flap to envelop the penis, I made use of the integuments of the penis itself, which had been dragged down by the weight of the tumour, forming a species of artificial canal. This method appears to me preferable, because this skin almost always preserves its natural integrity, while that of the anterior part of the pubes is often diseased, and is, moreover, covered with hair. I had in the first instance preserved the superior flap, not knowing exactly in what state I should find the integuments of the penis, and how far I might trust to them as a covering for the organ; but in the end I thought it right to remove it at the root of the penis. Henceforward, after assuring myself that the integument turned up off the penis is sound, I will proceed in a different manner; I propose to make two incisions, commencing at the pubes and ending in the perineum. I shall then circumscribe by two elliptical incisions the orifice of the anormal opening; and having dissected away the flaps, disengaged the penis and testicles, and cut through the pedicle of the tumour, I would bring the flaps together, and place the superior angle of the flap surrounding the orifice in the obtuse angle of the flap first formed, doing the same with the inferior angle. This process seems to me more rational and simple. I have been able to arrive at this idea only successively, as no assistance could be derived from authors, who offer no fixed rule on the subject. This operation may give rise to some other reflections on the causes and nature of this disease; for this patient, as well as two others before operated on, was an inhabitant of Rosetta, and it would appear that the malady was not constitutional, as the wound healed perfectly well and rapidly.

NEW METHOD FOR THE

DIVISION OF THE PELVIS,

IN CASES OF

DIFFICULT PARTURITION.

THE various methods for facilitating parturition in cases of deformed pelvis, are sufficiently known to most of our readers; but there is one which we believe is comparatively unknown in England, at least we do not find a description of it in any English work which treats of midwifery. The idea of this operation was first conceived by Aiken; and M. Velpeau, in his learned work on Operative Medicine, attributes the first execution of it to Catotica; but it appears that Velpeau has fallen into an error on this point, and that GALBIATI, a celebrated accoucheur at Naples, was the first to perform the operation of which we speak, and which consists in dividing the horizontal branch of the pubis, on both sides, above the obturator foramen. The operation had been tried on the dead body of a rachitic female, whose pelvis measured only an inch and a half in the sacro-pubic diameter, and an opportunity presented itself of noting the merits of this process on the living body in the month of March, 1832. The following is a detailed account of this interesting and novel case, which we take from *Il Filatre-sibezio*, 1833.

G. Negri, of Naples, of good health, and at present of sound constitution, was rachitic to such a degree, that her stature did not exceed 2½ feet: the lower extremities were extremely deformed, and the pelvis was so vitiated, that the promontory of the sacrum approached within an inch and a quarter of the pubis. She had been pregnant twice before this period, and succeeded in bringing on abortion in the early months; but having become pregnant again at the age of 30, similar attempts to bring on abortion failed, and she entered the hospital, fully convinced of the impossibility of being delivered in the ordinary way. The necessity of an operation was at once visible, and the method of Dr. Galbiati discussed: new trials were made on the dead body, care having been previously taken to inject the arteries of the pelvis. The operation seemed easy of execution; no important parts, vessels, or nerves, were injured, and although the diameters of the pelvis were artificially reduced to those which the pelvis of the patient presented, the hand could be introduced, and a body as long as the head of a child extracted. A numerous consultation of the professors of the school of Naples was now held; the opinions were various; some rejected the proposed operation altogether. Others preferred the cæsarean section; but the greater part of the surgeons and accoucheurs present decided in favour of the new method, as soon as the first pains of labour should appear. On the 30th of March, at day break, the pains came on: they continued increasing to the middle of the day, when the operation would have been performed, but the consent of the patient could not be obtained before six o'clock in the evening, when the uterine pains were rare and feeble. Before proceeding to the operation, M. Galbiati explained to those present, that when the antero-posterior diameter had one inch of extent, it was necessary to divide the pubis on one side only: that it required a still greater contraction of the inlet of the pelvis to render the double section indispensable, and that the case before them was of the first kind. Besides, as the inclination of the promontory of the sacrum to the left gave more space on the right side of the pelvis, it was proper to take advantage of that circumstance, and operate on the right side: finally, as the strength of the woman was not reduced, it would be right to permit the uterus to act for some time longer on the child's head.

The operation was commenced by a longitudinal incision of an inch and a half, which exposed the horizontal branch of the pubis, on the right side, as near as possible to the cotyloid cavity; the periosteum was detached by means of a concave scraper, and the bone divided; the ascending branch of the ischium was divided in the same manner, and the operation terminated by symphyseotomy: the operation lasted an hour and a quarter, but was performed without the occurrence of any accident: the patient did not seem to suffer much, and shortly after its termination the waters came away; the expulsion of the child was now left to nature. Four hours after the operation the patient was put into a warm-bath, during which the uterine contractions became more frequent and powerful: a moderate dose of secale cornutum was administered, but immediately rejected by vomiting. The patient passed a quiet night; in the morning the countenance was nearly natural, the pulse a little disturbed, tongue moist; abdomen free from pain, and uterus contracted upon

the fœtus; the pains still remained feeble and rare; the finger could barely touch the head of the fœtus, extremely high in the pelvis. The warm-bath was repeated twice in the course of the day without any effect, the contractions of the uterus remaining in the same state; during the night they were equally feeble. On the second day the face was natural; pulse feverish; tongue red and dry; the belly a little swollen, and slightly painful; the head of the child could be felt more distinctly, but it had not at all descended into the cavity of the pelvis. In this state of things, a new consultation was held, and it was resolved to divide the horizontal branch of the pubis on the left side, and to have recourse either to version or the forceps, as no result could be expected from the feeble condition of the mother. The patient at first refused to consent to this new operation, but agreed to submit at four o'clock in the evening. The operation was performed in the same way as that already described, and the head of the child, which was not at all engaged, was seized with the forceps, and brought down into the cavity of the pelvis, where it was left: the finger ascertained that the cranium had given way; and the parietal bones, which were detached from the rest of the skull, were easily extracted. As the death of the fœtus was now certain, the remainder of the brain was evacuated, and the fœtus easily extracted by the hand; there were two circles of the umbilical chord attached round its neck; the skin was so little altered, as to give rise to the opinion that the child was alive on the evening before. Although the manœuvres necessary for the extraction of the child did not last more than half an hour, and were performed with the utmost delicacy and caution, the patient immediately fell into such a state of prostration, that she seemed on the point of expiring; her countenance was cadaverous, the pulse insensible, and the body covered with a cold sweat. The means proper to revive and support her were immediately employed, and she passed a pretty tranquil night; in the morning the tongue was red and dry, and the pulse had rallied a little, but the abdomen was painful and tympanitic; a very fetid sanies was discharged from the vagina, and the patient expired during the night.

Autopsy.

The external genital organs were livid, and the wounds gangrenous: the anterior portion of the vagina was healthy, but the posterior wall was completely gangrenous and sphacelated in the portion corresponding with the symphysis of the pubis; the cellular tissue surrounding the anterior part of the pelvis was infiltrated, and the divided bones were altered in their colour as in necrosis; the section of the bone was clearly made on the right side, but on the left the bone seemed rather fractured, and broken into scales. The symphisis of the pubis was not divided, but the bone had been cut a little to the right side. The peritoneum and abdominal viscera were perfectly healthy. The uterus, which was contracted, was healthy on its external surface, but internally livid; the sacro-iliac symphisis had not been injured.

TUBERCLES

DEVELOPED IN THE

ORIGINS OF THE THIRD, FIFTH, SEVENTH, AND EIGHTH NERVES.

Loss of Hearing, Sight, and Smell; Preservation of the Sense of Taste, and of the Sensibility of the Integuments of the Face.

By M. Nelaton.

Feret, a girl, twenty-one years of age, was admitted into the Hôtel Dieu on the 10th of March; the immoveable expression of her countenance, her projecting and fixed eyes, and her slow manner of speaking, seemed to indicate the presence of idiotcy in this female. She complained of constant pain in the head; six years ago she commenced to experience these pains, and since that period the sense of hearing has gradually failed, and within three months she has lost the power of smell. The sensibility of the skin remained unaffected, both on the face and rest of the body. Voluntary motion was freely exercised on both sides with vigour; the sense of hearing was nearly lost; the voice, which had become feeble when she first entered the hospital, was soon lost altogether; when the point of a stylet was moved along the surface of the ocular conjunctiva, it did not excite the least mark of sensibility, although the membrane was dry, and evidently much inflamed. The whole surface of the nasal fossæ might also be touched with a stylet introduced into the nostril, without the patient being conscious of it; ammoniacal paste, when placed under the nostril, seemed at first to produce no effect, but in a few moments excited efforts to cough. The peculiar sense of the tongue was however unimpaired, for the patient recognised salt when placed in the mouth; the general sensibility of the tongue was also un-

affected, and the gums were in a healthy condition. The patient died suddenly on the 3rd of May. On the examination of the body, the middle portion of the brain and the medulla oblongata were found much developed; the olfactory and optic nerves did not present any morbid appearance during their whole course; the fourth pair of nerves, the external ocular motor of the left side; the glosso-pharyngeal and hypoglossal nerves seemed also free from any lesion; but all the other nerves of the brain were increased to at least three times their natural volume; small spheroidal tumours, of two or three lines in diameter, were developed in the interior of the nervous chords, or attached to their sides. Some of these tumours were perfectly well defined, though without cysts, and others were irregular in their forms. They were all formed by a yellow opaque matter, similar to that which is found in the centre of tubercles imperfectly softened, and the nerve itself suddenly contracted in size, after having traversed this tubercular mass. The two common motor nerves of the eye were implanted on the summit of a cone formed by this substance, which was also found in the fifth nerve on both sides, but at variable distances from their point of origin; a small tubercle, half a line in diameter, was attached to the origin of the external motor nerve of the right side, but the greater part of the nervous filaments passed above it, and were not altered. The seventh nerve was diseased from its origin to the bottom of the meatus auditorius internus; the pneumogastric nerve was also diseased in the same manner, for the extent of an inch below its exit from the foramen lacerum posterius; the optic and olfactory nerves did not present any morbid change of structure in their whole extent.

*** If our memory do not deceive us, it was a theory ingeniously advanced by the professor of anatomy in the University of Dublin, that the extremities of all the nerves of sense required to be joined by filaments from the fifth nerve, for the full exercise of their special functions; and upon this theory he ventured to predict that a connexion would one day be discovered between the retina and filaments of the fifth nerve. The present case seems to support, in some measure, the supposition advanced by Dr. Macartney. One of the most remarkable phenomena was the loss of smell and vision, while the olfactory and optic nerves were perfectly healthy, and the fifth nerve was diseased; we are not, therefore, to conclude, as Magendie has partly done, that the branches of the fifth are, more properly, nerves of sense than of sensibility, or that the optic nerve does not belong to vision, and the olfactory to smell. But, if we are not inclined to adopt the above theory, we may explain the loss of sense as some of the French writers would, who considered it indispensable that the general sensibility, which depends on the distribution of the branches of the fifth nerve, should be preserved complete, and that when this sensibility is altered, the parts to which the nerves pass become irritated, inflame, and no longer act as proper media for the exercise of the senses; thus, in the present case, the mucous membrane covering the eye was inflamed, ceased to secrete the mucus or fluid which keeps it moist in a state of health, and became unfit for the transmission of light.

MALFORMATION.

ABSENCE OF THE ANUS IN A YOUNG FEMALE 22 YEARS OF AGE.

Recto-vaginal canal; voluntary discharge of fecal matter by the Vulva; Absence of the Menses.

By M. Ricord, *Surgeon to the Venereal Hospital.*

The following interesting communication has been made to the editor of the *French Lancet*, by M. Ricord:—

I was consulted fifteen days ago by a young girl of twenty-two years of age, who requested to be examined, saying that her lover accused her of having communicated to him a blennorrhagia, which was utterly impossible, as she never had connexion with any other person; she also asserted that she was not made like other women, and begged me in consequence to pay a little more attention than common to her case. Having been frequently consulted by many females on pretended deformities, which consist in nothing more than a slight prolongation perhaps of one nympha, or of the caruncule myrtiformes. I am not in the habit of attaching much importance to their stories on this subject. The external genital organs did not present anything remarkable or morbid, and

the speculum was immediately introduced with facility. The parts which embraced its extremity were perfectly healthy, and did not offer anything abnormal or morbid to the eye. However, the depth to which the instrument was carried without meeting the neck of the uterus began to excite some astonishment, when a lump of fecal matter was brought into view, simulating to the touch the os uteri, and also some grape seeds, which were at first taken for vegetations. Being now convinced that some malformation existed, as the girl had at first mentioned, M. Ricord examined the organs of generation with the greatest care, and found the parts in the following state: the labia majora and minora, the clitoris and its prepuce were of the regular size, and well formed; the meatus urinarius was placed in its accustomed situation, and did not offer anything particular; the posterior commissure of the vulva and the fourchette were also in the normal state; but on examining the perineum, we could discover no trace of anus; the place which the orifice should naturally occupy was marked by a brown spot, irregularly radiated, about the size of a shilling, and without any hair, although the mons veneris and vulva were overshadowed with a great abundance of this material. The ring of the vulva, which did not present any carunculæ myrtiformes, was furnished with eccentric folds formed by the mucous membrane, and engaged a certain power of contraction much less than that of the sphincter ani, but much more powerful than that of the common constrictors of the lower part of the vagina. Beyond this vulvar ring the finger penetrated without causing any uneasiness into a kind of canal, which from its situation and functions deserved the name of recto-vaginal. The speculum, which did not produce the least pain when introduced, exposed to the view a mucous membrane, deprived of those transverse ridges so commonly found in the vagina; and when pushed on to its full length without meeting the least prominence or line of demarcation, it was arrested by fecal matter. When a finger was placed in this canal, while a female sound was introduced through the urethra into the bladder, nothing was felt between them except a septum, which might be compared to the utero-vaginal, or recto-vaginal wall. The toucher, exercised in every possible direction, and the speculum introduced to the greatest depth the instrument would permit, did not discover the least trace of a uterus. Upon questioning the woman with respect to the processes of defecation, menstruation, and sexual intercourse, M. Ricord discovered the following particulars; the fecal matter was always passed by the vulva, and was perfectly under the command of volition, but gaseous fluids often escaped involuntarily: when the fecal matter presented itself at the orifice of the vulvar ring, she felt a desire to go to stool, and when this desire was satisfied, the finger introduced as deeply as possible, no longer met with any obstacle; the female besides has always taken care to use an injection immediately after, and to wash herself well, by which precaution she always kept herself clean. Menstruation has never made its appearance under any form, and no trace of blood has ever been discovered by her in the urine or feces. Although she has lived for three years with the same man, the latter has never appeared to have suspected or known the existence of any malformation; the first sexual intercourse which she had was not accompanied with any pain, for there never was any hymen to break, and the construction of the vulvar ring was feeble in this young woman. She feels the desire of sexual intercourse; however, she says, that according to the account she received from her female friends, her own desires are less strong, and her enjoyment not so great as in others of her sex. Finally, this girl is tall, slender, well made, her form and physiognomy are those of the female; the bosom is well developed, and has never experienced since the age of puberty any sudden change of volume, her voice is soft and sweet like that of a female. Before we terminate this observation, the practical and moral consequences of which may be readily deduced, we may notice that in three days this young female, who was not ill at the time of her first visit, returned with a urethral blennorrhagia, without any affection of the vulva or recto-vaginal canal.

STATISTICAL VIEW

OF THE

MEDICAL JOURNALS

AT PRESENT PUBLISHED

IN GERMANY.

We take this opportunity of laying before our readers an account of the medical journals published in Germany, which we have derived from a foreign contemporary.* We shall be disposed at some future time, probably, to give a view of the periodical medical literature of France and Italy, and

* Gaz. Med.

thus furnish an interesting *resumé* of a subject too much neglected in this country. The number of medical journals now published in the German States is very considerable; in looking over the list of those medical periodicals, one is particularly struck with the number of journals which are consecrated to some particular branch of the healing art. For example, *medical literature*, to which we do not find any journals specially devoted either in France or England, engrosses in Germany the entire pages of eight or ten different periodicals, some of which are confined to the analysis of foreign and domestic journals, while others are intended to diffuse a more extensive knowledge of new and useful works. In the present paper we propose, first, to pass in rapid view those journals which are dedicated to medicine in general; next those which treat of surgery, or some special branch of surgery; and, thirdly, we shall pass to the journals of accouchment, those of medical jurisprudence, mental diseases, anatomy, physiology, and pharmacy, and, finally, those which are consecrated to the literature of medicine.

1. Amongst the journals confined to medicine in general, that published by Hufeland and his son-in-law Osann, at Berlin, deserves the first notice. *Die Bibliothek der Practischen Heilkunde* (The Journal of Practical Medicine), one of the oldest in Germany, appears in monthly numbers; it is one of the most celebrated in the country, and has a very extensive circulation; it is chiefly distinguished by the practical nature of its contents, and the attachment of its editors to the doctrines of Hippocrates.

2. Another journal, of nearly equal celebrity, appearing also at Berlin, is that of Professor Rust, entitled *Magazin für die Gesammte Heilkunde* (Magazine of Medicine in General). This periodical already forms about forty volumes; like many of the German journals, it does not appear regularly at fixed periods, but generally about six numbers are published during the year, three of which form a volume. This journal is chiefly distinguished from its rival by more frequent excursions into the domain of surgery, or, as it is in modern times called, external pathology.

3. A third periodical, of some merit, is that directed by Messrs. Horn, Wagner, and Nasse, the two former, professors at Berlin, the latter at Bonn; its title is *Archiv. für Medizinische Erfahrung*, &c. (Repository of Medical Experience in Practical Medicine, Surgery, Accouchment, and Legal Medicine). This journal appears every two months, in very large numbers, and contains original articles of value on all the subjects above enumerated.

4. Besides these three journals of practical medicine which are published in the Prussian capital, we have two others appearing at Vienna and Heidelberg. The former is entitled, *Medizinische Jahrbücher des k. k. Österreichischen Staates* (Medical Annals of the Austrian States), published by Baron de Stifft and Dr. Raimann; a number appears about every other month, four of which make a volume; it is the only journal of its kind published in Austria, and is perhaps one of the best periodicals in Germany. Beside medical articles, it contains the sanatory regulations and laws from time to time ordained by the Austrian government. The physicians and surgeons of the Vienna hospitals publish therein a resumé of their experience; and it also contains the results of experiments, &c., performed at the veterinary institution in the Austrian capital.

5. The Heidelberg journal is published by Messrs. Harless, Puchelt, Chelius, and Nægele; the first, professor at Bonn; the three latter, professors to the Faculty of Heidelberg. This journal, *Heidelberger Klinische Annalen* (Clinical Annals of Heidelberg), has existed for several years, and treats, indiscriminately, of medicine, surgery, and midwifery; many of the articles are well written, and contain just views.

6. Germany possesses many weekly journals; there are at present six, the oldest of which dates from 1830. The *Medizinisches Conservationsblatt* (the Medical Repository), which appears at Hildburghaussen, in Saxony, is published by two distinguished physicians, Hohnbaum and Jahn. Of the five others, three appear at Berlin, and two at Leipzig.

7. The first of the weekly Berlin journals is entitled *Wochenschrift für die Gesammte Heilkunde* (Weekly Journal of General Medicine); it is published under its present form, having succeeded Casper's Repertorium, since the current year, by Casper, Romberg, De Stosch, and Thaër.

8. The second weekly journal is published, by the medical circle of Prussia, under the name of *Medizinische Zeitung* (Gazette of Medicine); the editor of this paper, which first appeared in September 1832, is M. Hecker; it is specially devoted to an account of the progress and advancement of medicine in the Prussian States.

9. The third weekly periodical of the

Prussian capital, *Berliner Medizinische Zeitung* (Berlin Gazette of Medicine), by Dr. Sacks, commenced also in 1832. Its object is to give an account of all new publications, extracts from other journals, and short original notices.

10. One of the weekly journals of Leipzig bears the following title, *Zeitung für das Gesammte Medizin alwesen* (Gazette of everything concerning Medicine). Edited since 1830 by Dr. Klose.

11. The second is a continuation of the Cholera Gazette; since last December it has appeared under the name *Wöchentliche Beitrage für Medizinischen und Chirurgischen Klinikee.* (Weekly Contributions for Medical and Surgical Clinics, &c.) Faithful to its destination, this work of Messrs. Clarus and Radius devotes a special attention to epidemic and endemic diseases; it also furnishes a faithful account of the progress of medicine in Saxony.

There are several other periodicals which are confined to medicine in general; but have less publicity, as being each the journal simply of some one physician, or of a society of physicians. Of this number are,

12. The *Esculape* of M. Dzondi, which appears at Halle in Saxony, and the first number of which dates only from last year. M. Dzondi instituted this journal as a repository for the result of his observations and experience. The contents chiefly regard subjects in surgery, comprehending also ophthalmology and venereal diseases.

13. The periodical published by M. Pfaff at Keil, under the title *Mittheilungen aus dem Gebieteder Medizin, Chirurgie, und Pharmacie* (Communications in Medicine, Surgery, and Pharmacy). This journal also commenced last year, and appears, like the former, at irregular periods. It is supported by contributions from the physicians and apothecaries of the Duchies of Schleswig and Holstein.

14. The Journal of Medical Correspondence of Wurtemberg, *Medizinisches Correspondenzblatt des Würtembergischen Œrzlichen Vereins*, which has appeared at Stuttgart since the commencement of the present year, and is edited by MM. Blumhardt, Duvernoy, Riecke, and Seeger.

15. The journal of the physicians and surgeons of the Duchy of Mecklenbourg, *Beytrage Mecklenburgischer Aerzte zur Medizin und Chirurgie*, which has appeared for three years at Rostock and at Schwerin, and is edited by Dr. Hennemann.

16. *Mittheilungen aus dem Gebiete der Gesammten Heilkunde*, published by the Medico-Chirurgical Society of Hamburg, in that city.

17. *Verhandlungen der Vereinigten Gesellschaften der Schweiz* (Transactions of the United Medical Societies of Switzerland), published at Zurich. None of these different journals is published at a fixed period; they merely appear according as materials become accumulated sufficient to form a number.

As the theory of Broussais has a journal in France, so that of homoiopathism has its periodical organ in Germany.

18. The Archives of Homoiopathic Medicine (*Archiv. für die Homœopathische Heilkunst*) are published at Leipzig, and edited by Dr. Stapf. A number appears about every two months, of which three form a volume. The journal has already arrived at its eleventh volume.

19. Germany possessed at one time three journals of surgery, viz., that of M. Langenbeck, *Le Chiron*, and that of MM. Græfe and Walter. We do not know if the two former continue still to appear; but the third, which was always the most celebrated, is still published at Berlin under the name of *Journal der Chirurgie und Augenheilkunde* (Journal of Surgery and Ophthalmology). It has already arrived at its eighteenth volume, and is one of the most extensively-circulated journals in Germany.

20. We may also enumerate here the journal of M. Hesselbach, which is almost exclusively surgical, and which first appeared last year at Bamberg, under the title of *Medizinisch-Chirurgische Beobachtungen und Erfahrungen* (Medico-Chirurgical Observations and Experiments). The two first volumes of this periodical contain only the articles of M. Hesselbach.

The art of accouchments is a part of medicine which the Germans have studied with much predilection; hence we find two journals dedicated to obstetricity.

21. They are, the journal of Siebold, *Journal für Giburtshülfe, Frauenzimmer und Kinderkrankheiten* (Journal of Midwifery and Diseases of Women and Children). This periodical is published in large numbers, at Francfort-sur-le-Main, and has reached to twelve volumes.

22. The general journal of Germany for midwifery, *Gemeinsame Deutsche zeitschrift für Geburtskunde*, which appears at Weimar, and counts at present eight volumes; the principal editors are, Busch, Mende, and Ritgen.

There are two journals in Germany consecrated to legal medicine, each appearing every three months. The oldest

is that of Henke, professor at the University of Erlangen, who is well known from his excellent treatise on the diseases of children, and various works on legal medicine.

23. The *Zeitschrift für die Staatsarzneikunde* (Journal of Legal Medicine) has been published at Erlangen for thirteen years; it contains several excellent original papers, and gives a view of the progress of medical jurisprudence in foreign states.

24. The other journal was commenced at Berlin in 1831 by Dr. Wildberg, under the title *Magazin für die Gerichtliche Arzneiwissinschaft* (Magazine of Legal Medicine).

Both these journals contribute in a very powerful manner to the advancement of medical jurisprudence and public hygeine, by the able manner in which they treat the different questions arising in this important branch of medical science. It is a matter much to be regretted that England has not as yet been able to produce a journal of this kind.

25. There are also numerous journals of anatomy and physiology in Germany; the most ancient is that of Meckel, which appears at Leipzig under the title of *Archiv. für Anatomie und Physiologie.* (Archives of Anatomy and Physiology). The name of Meckel continues to give much celebrity to this journal, which has reached about ten volumes.

26. The second, *Zeitschrift für Physiologie* (Journal of Physiology), edited by Tiedemann and Treviranus, is published at Heidelberg.

27. The third is that of M. Heusinger, *Zeitschrift für die Organische Physich.* These are all illustrated with engravings. Within the last few years M. Professor Ammon of Dresden has published a special journal of ophthalmology under the name *Zeitschrift für die Ophthalmologie.* In this journal the most celebrated ophthalmologists of Germany are accustomed to record the results of their experience and long observation, from which this part of surgery cannot fail to derive great advantage. Each number contains illustrative figures.

As to the journals of pharmacy, we may content ourselves with enumerating the following:—

28. The *Annals of Pharmacy*, published at Lemgo and Heidelberg, by MM. Brand, Geiger, and Liebig.

29. *Berliner Jahrbücher* (Pharmaceutical Annals of Berlin.

30. The *Journal* of M. Frommsdorff.

31. The *Repertory* of Buchner.

32. The Central Pharmaceutical Journal (*Pharmaceutisches Centralblatt*), which contains nothing but extracts from other journals.

The journals of medical literature in Germany are numerous, and various in the objects for which they are published. Some merely give analyses of new works; others join to those analyses, extracts from journals, or an original leading article. There are some which give a complete analysis of all the German and foreign journals, while others, again, select the best articles contained in other journals, which they condense. They may be enumerated in the following order:—

33. *Bibliothek der Practischen Heilkunde* (Library of Practical Medicine) of Hufeland, which forms a kind of supplement to his practical journal. A small number appears every month. This journal only gives the analysis of new works, whether German or foreign; but it gives at the end of each year in a separate number, a methodical index of all the new facts to be found during the year in the French and foreign medical journals.

34. The annals of M. Hecker (*Litterarische Annalen der Gesammten Heilkunde*). This journal, now in its ninth year, appears every month. Each number contains one or more original articles, analyses of new works, and analyses or extracts from the journals. Like the preceding it appears at Berlin, and comprehends the whole range of medical literature, whether foreign or German.

35. The annals of M. Pierer (*Allgemeine Medizinische Annalen*). This journal, which is published in the quarto form, appears at Altenbourg; it is of very old standing, and similar in its nature to that of M. Hecker. Latterly, the name has been changed to *Allgemeine Medizinische Zeitung* (Gazette of Medicine), and it proposes to record everything new and interesting in the physical and natural sciences.

36. *Medizinische-Chirurgische Zeitung* (Medico-Chirurgical Gazette) of Dr. Ehrhart. This is a continuation of the old Gazette of Salzbourg, and now appears at Innsbruck; it is perhaps the most complete journal of medical literature, and furnishes excellent analyses, with occasional original articles.

37. *Magazin der Auskindischen Literatur der Gesammten Heilkunde* (The Magazine of Foreign Medical Literature), by Drs. Gerson and Julius of Hamburg. This journal comes out every two months; it

gives, first, an original memoir, then analyses of foreign works, and, finally, extracts from foreign journals,—its sole object being to make the German public acquainted with the progress of medicine in other countries.

38. The journal of Dr. Kalisch, *Medizinische Zeitung der Auslandes* (Foreign Gazette of Medicine). This journal appeared at Berlin at the commencement of the present year, and is published twice a week; it contains notices on France, England, Italy, and America, and records the most interesting medical facts observed in those different countries.

39. The Repertory of Dr. Behrend, *Allgemeines Repertorium der Medizinisch-Chirurgischen Journalistik des Auslandes* (General Repertory of Medico-Chirurgical Journalism in Foreign Countries). This journal appeared at Leipzig in 1831. It comes out in monthly numbers, and takes, one by one, all the foreign journals, which it regularly and completely analyzes.

40. *Allgemeines Repertorium der Gesammten Deutschen Medizinisch-Chirurgischen Journalistik* (General Repertory of all the Medico-Chirurgical Literature of Germany). This periodical, published by Dr. Kleinert every month, is very similar in object to the former, with this exception, that it analyzes only domestic journals.

41. *Notizen Ausdem Gebiete der Natur und Heilkunde* (Notices of the Medical and Natural Sciences) of M. Froriep, published at Erfurt. A quarto number appears every five or six days, and it counts at present about thirty volumes. The first half of each number is dedicated to the physical and natural sciences; the other half to medicine; it republishes all the foreign memoirs and scientific facts which are most novel and interesting, and is chiefly remarkable for the rapidity with which it communicates medical news.

42. The collection known under the title *Sammlung Auserlesiner Abhandlungen zum Gebrauch Praktischer Aertze* (Collection of Memoirs, chosen for the Use of Medical Practitioners). This periodical, which now comprises forty volumes, appears at Leipzig. Without restricting itself to any precise period of publication, it contains, principally, the best memoirs which have appeared in the French and English journals.

To these we may add the numerous literary gazettes, which, though not strictly confined to medicine, yet contain excellent reviews of all the new medical works published, such as the *Literary Gazette* of Halle, Leipzig, and Jena; the *Literary Advertiser* of Goettingen, the *Berlin Annals*, the *Repertory* of Beck, &c.

Such is a brief view of the state of medical journalism in Germany, the most striking feature of which is, the number of special periodicals. Were we to judge the progress of any science by the number of periodical works devoted to its advancement, we should be compelled to acknowledge that medicine is cultivated with extraordinary zeal indeed in Germany. One thing at least is certain, that foreign medical literature is rendered in a high degree familiar to the German practitioner.

BRISTOL MEDICAL SCHOOL.

To the Editor of THE LANCET.

SIR,—Being informed that an imperfect and incorrect newspaper statement of my address to the students, &c., at the opening of the Bristol Medical School, has been sent to you, I am induced to forward for your perusal a more full and correct copy of that almost unpremeditated performance, should you deem it in any way worthy of your attention.

I remain, with much respect, Sir,
Your obedient humble servant,
A. CARRICK.

Clifton, Bristol, 7th Nov. 1833.

ADDRESS OF DR. CARRICK,

AT THE OPENING OF THE ABOVE SCHOOL,

On Monday, October 14th, 1833.

Gentlemen,—I am concerned to find that through the over-ardent zeal of a friend, wholly unauthorised by me, you have been led by public advertisement to expect from me an address, which neither time nor talent enables me to furnish as it ought to be. It was in fact only yesterday that I was able to turn my attention in any degree to the subject; and I am very conscious that the few undigested ideas which it was possible for me to commit to paper, are but little deserving of your time or attention.

Nevertheless, Gentlemen, I have no hesitation to say that it gives me great and sincere pleasure to meet you on the present auspicious occasion—an occasion which will, I doubt not, form a memorable epoch in the medical history of Bristol.

Gentlemen, you all know that for several years past lectures on some important branches of medical instruction have been delivered in this city—delivered, I doubt

not, with great advantage to the students, and credit to the lecturers; but this is the first time that an adequate number of respectable and talented individuals have united, for the purpose of giving instruction in every department of medical science—the first time that anything has appeared which could have any title to the character of a medical school. The benefits which must accrue from such a comprehensive system of lectures, as is here announced, are much too obvious to require illustration; and when we look back and contemplate the many facilities which this large and opulent city affords for the purpose of a medical school, it seems somewhat surprising that such an association as this should not have taken place long ago.

The formation of a medical school was an object which I had much at heart from my first commencement of practice in this place, nearly half a century ago; but many obstacles then stood in the way, which happily no longer exist. The unfortunate result of the French Revolution, which at the moment alluded to had just commenced, proving the means of inspiring the public with dread of, and aversion to, almost every improvement. Any alteration of any sort—every innovation, however useful, or however wanted, was held to be dangerous, and even disloyal; and the march of improvement, if not actually retrograde, was arrested for a whole generation.

With the view of promoting the formation of a medical school, I was the more anxiously desirous to become a physician to the infirmary, but it so chanced that I was then opposed by a gentleman* in every respect more deserving than myself—a man of whose friendship I had ever afterwards the honour to boast, and I was very naturally and very properly thrown out. This was not a little mortifying to a young and ambitious mind, and not only mortifying but seriously injurious. It was, however, necessary to live; and my attention was of necessity directed for a time to other quarters, and other objects; and although some fifteen years afterwards I was elected to the infirmary in a most flattering manner, the heyday in the blood had then gone by—I was then immersed in professional cares and duties, and the indolence naturally attendant on advancing years created difficulties and dread of trouble, which at the earlier period would have only proved additional provocations to exertion. The medical school was not formed—to my shame I own it. Had it been formed, and I am persuaded it might have been, I should have now been proud to have had my name associated with the prospective, but I trust certain splendour, of the Bristol Medical School.

But although not organised by me, nor with my assistance, I rejoice to see it done. I am not envious, Gentlemen, of your superior merit or future fame; and I join with you in most sincere and heartfelt wishes that your success may outrun your most sanguine expectations.

Gentlemen, before I sit down, I will venture to address a few words to the junior part of my audience—to the students just entering on the wide and expansive field of medical instruction, in reference to some of the advantages which are here offered them.

Of the various objects to which the students' attention ought to be directed, the first, and beyond all others in point of importance, stands anatomy, or the knowledge of the visible structure of that machine, towards which his whole professional exertions are ultimately to be directed. Anatomy is the initiative—the very alphabet of the science of medicine, without which we cannot advance a single step. As soon might we attempt to learn the Chinese language without a key to its symbols. Night and day, Gentlemen, this must rivet your anxious attention, and you must not be satisfied with a general knowledge of the subject—you must not be content to gather knowledge through the eyes or by the fingers of other men—you must, after a time, become your own demonstrators.

To those who intend to make surgery their chief and ultimate object, the all-importance of anatomical knowledge is sufficiently obvious; but I must beg to impress upon those who may intend to turn their attention to the medical department, the equally urgent necessity of a thorough, minute, and critical anatomical knowledge. It is by a thorough acquaintance with anatomy and physiology, that the laws and functions of the various parts of the living body can be discovered, and the ultimate object—the cure of disease, and the preservation of life, be rationally and successfully attempted or accomplished. Next in importance to the knowledge of the healthy structure, stands that of the morbid structure of the human frame; and no part or portion of medical science is more pregnant with useful and practical instruction than the study of morbid anatomy. No opportunity of post-mortem investigation should ever be let slip. And here, Gentlemen, is a branch of study that will never have an end—it must end only with our lives. In this, and many other mat-

* The late Dr. Lovell.

ters, we are students to the end of our days.

As it is necessary for the medical student to study anatomy in all its branches with the zeal of a surgeon, it is not less necessary and important for the surgical student to apply himself with equal zeal and ardour to that which is commonly accounted the medical department of study. To students of both descriptions the plan laid before me offers the opportunity of instruction, not only in anatomy in all its subdivisions, but in all the important branches of medical knowledge. In surgery, or the application of structural knowledge to the cure of an extensive class of diseases and injuries. In materia medica, which may be considered the knowledge of the tools and implements to be employed in the cure of almost all diseases. In the theory and practice of physic, and clinical instruction, names, by the by, incorrectly applied, for the so-called practical lectures are, strictly speaking, theoretical, while the clinical instruction is the true practice of physic. Ancient names and customs are tenacious; and it is only of late years, comparatively, that the clinical part of medicine or surgery has attracted that degree of attention in the schools to which it is justly entitled.

Clinical instruction, at the patient's bedside, as the name imports, is the highest and most useful portion of medical tuition; and is the most direct and obvious means of imparting practical knowledge to the young and uninitiated, and of preparing them for the exercise of the dangerous and difficult duties they are about to undertake. But as the magnitude and hurry of hospital practice could not admit of the dedication of sufficient time for any individual case on the spur of the moment, it is found convenient and useful that lectures should be given in a more deliberate and comprehensive form, on such particular cases as may best serve to illustrate the theoretical view of the disorder, and the practice adopted. When once the student's mind is sufficiently stored with the preliminary parts of knowledge, he cannot too assiduously and perseveringly apply himself to this. And here post-mortem examinations will prove, as indeed they do under every circumstance, of essential advantage and importance.

There are, besides these already enumerated, various other departments of science which are eminently useful in the attainment of medical knowledge, and which are here set within your reach. Of these chemistry holds a principal rank. Every breath of air we respire, every morsel of sustenance we swallow, belongs to the province of chemistry; and there is scarcely a phenomenon of dead or living matter that is foreign to its laws.

I need scarcely detain you, Gentlemen, by adverting to various other sources of knowledge here offered to your attention. Botany, not less amusing than instructive—medical jurisprudence, a most important and difficult branch of science, and one hitherto too much disregarded, but which will now, I am sure, be rendered both interesting and instructive, by the talented gentleman who has undertaken the duty.

On midwifery I would beg to say a few words—although nothing I am able to say can sufficiently impress on your minds the importance of the subject. It has been too much, greatly too much, the habit and fashion of the medical world, and not only of the medical world but of the world at large, to neglect or undervalue this, in every way important, branch of the healing art. It has been considered as out of the physician's province, and as beneath the dignity of the professed surgeon, to attend to that department; whereby it has (ever since the race of midwives became extinct) been consigned generally to the younger and more inexperienced part of the profession; from whence very serious consequences have, I fear, too frequently arisen. It is true, that, in general, the female sex perform this great function of nature with considerable easy and safety, and without much necessity for medical interference; and were mankind still living in the state of uncivilized or savage nature, but a few degrees advanced beyond the beasts of the forest, there would seldom be any need of accoucheurs or doctors. But in the present state of wealthy, luxurious, and highly-educated nations, where the mind is everything—where the sword may be said to wear out the scabbard—so many alterations, and deteriorations, and liabilities to disease, have been engendered, that the operation of child-bearing, which to the unrefined female would scarcely be felt as an indisposition, becomes fraught with danger of the most acute and alarming nature, requiring for its control or mitigation the fullest and utmost possible concentration of science and experience. It is, in my view of the matter, deeply incumbent on every student, whatever branch of the profession he may intend to pursue, to pay due attention to this department, as important to his own success in life, as it is interesting to society at large.

In London, and a few other places, it is customary for a certain portion of the medical faculty to devote themselves principally, or entirely, to that sole object. This is very well; but I am not certain that it is the best arrangement possible, even as to London. In other places, midwifery is

considered as belonging exclusively to the surgical department, with the almost total relinquishment of it by the medical. This, however, is, in my opinion, very wrong. There is no disease to which the human body is liable, that is more purely and thoroughly medical, than puerperal fever; and none where a more prompt and vigorous, yet cautious and corrected application of the most comprehensive knowledge of the healing art is more imperatively called for. Although sanctioned by custom, it is, in my humble opinion, an absurd and culpable affectation in physicians to decline this very important part of professional duty. A puerperal fever (I might add the management of a parturient woman) is as much within the medical department as gout, or enterites, or the plague; nor is it more naturally or intrinsically in the surgeon's department, because sometimes it may be necessary to use an instrument, than typhus fever or phrenitis, where it may be necessary to use a lancet.

But in point of fact, the division of the profession into medical and surgical, is capricious and indefinite; and is indeed practically impossible—is at best but of doubtful utility, in any point of view; and I am disposed to think, in many respects, injudicious and hurtful—hurtful alike to the profession and to the public. The medical world, as Hamlet says, "is out of joint." Legislative interference alone can rectify its anomalies; and the legislature have too long neglected their duty on this complicated and important subject, and seem still unwilling, or afraid, to enter on it. It is clear, however, that their attention cannot much longer be withheld from it. The medical body politic cannot continue in its present incongruous and anomalous state.

In the mean time, we must do the best we can under existing circumstances. It is the duty, as it is the interest, of every medical student to be equally prepared at all points. He ought not, and he cannot, be at peace with his own conscience, if he is deficient in any one.

Let me beg you, Gentlemen, to consider the awful responsibility you are under when you come into actual practice. Every time you are called to the bedside of a patient, you are placed as a juryman on his life or death; you are even more—you are in yourself an inquest, without fellow-jurymen to consult with, without lawyer to correct or judge to instruct you; and upon your almost instantaneous decision, as certainly in many cases, the life of a fellow-creature depends, as if you were seated on his trial in a jury-box. To bleed, or not to bleed—to give this, or that medicine—or to give it in larger or smaller doses—is decisive of his fate. In this anxious position you will find your clinical notes and reminiscences of greater utility and comfort to you, than all the medical books in your library. I well remember that before I entered into business I was wont to sleep as sound as a top; but during my earlier years of practice I could scarcely sleep at all; and the sleepless habit has continued ever since to haunt me.

You will, I trust, excuse me, Gentlemen, for dwelling so much on the necessity of bending your attention to that portion of instruction which is considered more particularly medical; for you need not be told that, at almost all hospitals, it is the habit of the pupils and students to direct their attention far more exclusively to the surgical than to the medical part of study; although a moment's reflection might be sufficient to convince them that this was altogether wrong. For, in the first place, by far the greater part of the profession are, what have lately been termed, general practitioners. There are, in fact, comparatively few who practise any single branch; few who practise solely as physicians, and fewer still who adhere to surgery alone. But the general practitioners are much more of physicians than of surgeons; they are the physicians in ordinary, and act twenty times in that capacity for once in the character of surgeon. Even the pure surgeon, if such a man there be, is, in his own particular branch, much more frequently called on to prescribe than to operate. How clearly then it behoves the student, whatever may be his ulterior designs, to pay an equal degree of attention to every department of medical instruction!

No man can be a thoroughly good surgeon without being, as to education, a good physician; nor can any man be a good and well-qualified physician without all the essentials of surgical education. I do not, however, consider the hitherto customary apprenticeship as at all an essential or necessary part of surgical education. On the contrary, an apprenticeship in a small town or city, where neither infirmaries are to be found, nor anatomical lectures given, is a cruel waste of time. The benefit derivable from a five, or from a fifty years' apprenticeship, under such circumstances, is not worth three straws to its ostensible object—the apprentice. It may be otherwise, no doubt, in places where medical schools and hospitals exist, as in such places some portion of the apprentice's time may be profitably employed in the lecture-room, &c.; but this, be it observed, is altogether independent of the apprenticeship, and could

be equally well accomplished without the apprenticeship as with it.

Until very lately, London, Edinburgh, Glasgow, Aberdeen, and Dublin, were the only places in the United Kingdom where an apprenticeship could be served with the slightest possible utility to the surgical student. To this list I am now happy to add Bristol. And such is the spirit of the age, I am now disposed to hope, that wherever there is a large population, and a good infirmary, a medical school, with its concomitant advantages in the education of youth, will henceforth be there found established.

These remarks might be applied with nearly equal propriety to the apothecaries' apprenticeship, as to the surgeons'. In point of fact, the apothecaries have of late universally withdrawn themselves from their ancient duties and station, and entered the ranks of surgery. The druggist is now, what the apothecary originally was, and the *quondam* apothecary is now the physician and surgeon in ordinary; having in most instances relinquished the dispensing and compounding of medicine altogether to the druggist; or, which is nearly the same thing, delegated the office to an assistant in his own house or premises. Although, therefore, the worshipful Company of Apothecaries (who, and not the College of Physicians, have taken on themselves the formation and examination and licensing of those physicians in ordinary) have decreed, that a five years' apprenticeship shall be a necessary qualification; there can be no more reason nor necessity for such apprenticeship in their education, than in that of the Fellows or Licentiates of the Royal College of Physicians. Pharmacy is in a great measure a practical art, although a nice one; and there, as in other mechanical arts, an apprenticeship may have its use; but it is altogether distinct from the science of medicine; and any student of physic or surgery who is of a proper age, and has had the advantage of previous chemical instruction, may acquire all the knowledge of pharmacy, which can be necessary or useful to him, in a very few weeks, and during the usual intervals of his other studies.

I am not insensible to the very considerable improvement which has of late years taken place in the education and acquirements of the apothecaries and general practitioners of the present day, nor to the services which the Apothecaries Company have rendered the profession and the public by their active legislative exertions; while the College of Physicians, the accredited guardians of the profession and the public, with whom these, and many other improvements ought to have originated, have actually done nothing, or nothing to the purpose, but sat dozing over their dignity, and exclusive privileges, while the wily and worshipful Company were cutting the grass under their feet.

In what I have stated above, I have only meant to enforce a very obvious truism—that since Apothecaries and Surgeons act now as Physicians, the public have a right to expect that they should have the physicians' education, and not the druggists'; the first and most obvious step towards which would be, the abandonment of the time-killing apprenticeship. Without some such approximation in the education and qualification of all the members of the profession, there never can exist amongst them that harmony and good-will, and united energy and zeal, so greatly to be wished, and not more important to their own interest than to the public welfare.

I had almost forgotten, Gentlemen, to advert to a subsidiary branch of instruction, which, although not so obviously or customarily connected with medicine, is of vast importance in evolving the reasoning faculties, and in forming the accomplished practitioner. I allude to elementary mathematics, a branch of knowledge which no gentleman or member of a learned profession should be ignorant of. It fortunately happens for the medical student in this place, that he has, perhaps, the very best opportunity which this kingdom affords for the acquisition in question. At the Bristol College he will find instructors in that department inferior to none in merit, and with the additional advantage of being unfettered and untrammelled by the rusty forms and usages of more ancient seminaries. He may there too acquire, in a superior degree, the more usual, and I will not say less useful, accomplishment of ancient and modern languages. In short, from henceforth it will be difficult to find any city or place which can present so many opportunities and advantages of education, in almost every department of science, as our own venerable and time-honoured city.

And this leads me to offer a few words on the subject of attaching a medical school to the Bristol College. To me it appeared from the beginning most desirable that a school of medicine should form an integral part of the college; and this was one reason for my joining it, and for adhering to it through good fortune and through bad. It is needless to advert to the contingencies which, in some degree, impeded for a time the progress of that now flourishing institution. Happily, the difficulties were but temporary; and being now surmounted, there is a fair prospect

that, in a short time hence, the college will be able to extend its care and protection to that most essential department of science to which we belong. And although it may not be obvious how that object could, at the present moment, be accomplished; yet this I may venture to say, that there exists in the members and in the council of the Bristol College, every disposition to favour and facilitate such a desirable consummation.

Before I conclude, Gentlemen, there is one subject which I wish, and yet I hesitate to advert to. It is the only drawback on the lively and heartfelt satisfaction which I feel on this eventful occasion. I allude to the schism which has unfortunately taken place amongst the cultivators of our peaceful science, and which has occasioned painful feelings in a quarter where it is to be much and sincerely regretted. I lament this occurrence on public, on professional, and on personal grounds; and although I perceive most formidable difficulties to stand in the way, my anxiety for a happy adjustment is such, that I cannot entirely relinquish the hope of it.—When there is a mutual desire to conciliate and to accommodate, the task is seldom difficult; and great would be the benefit resulting from a cordial concentration of talent, and unity of effort, in furthering the important object we all have in view.

Gentlemen, I conclude with apologising for detaining you so long—with thanking you for your kind indulgence—and with again offering my sincere aspirations for the fullest and most gratifying success to your laudable undertaking.

ALDERSGATE-STREET DISPENSARY.

To the Editor of THE LANCET.

SIR,—You will, I am persuaded, peruse with great pleasure the annexed resolutions, relative to proceedings in which you have displayed a deep and powerful interest. That it is the wish of the meeting from which they proceeded that they should be extensively circulated, I cannot doubt, and, therefore, I have to request, that in conformity with your very liberal conduct on this great public question, you will insert this important document in your next publication.

I remain, with respect,
GEORGE BIRKBECK.

50, Broad-street, Nov. 12th, 1833.

ADDRESS FROM LIVERPOOL.

At a numerous meeting of the medical practitioners of Liverpool, convened by public advertisement, and held in the Medical Library, Lime-street, 6th November, 1833.

Dr. RUTTER in the Chair.

It was moved by Dr. BRANDRETH, seconded by Mr. DAWSON, and resolved unanimously, "That the attainment of medical appointments to public institutions, by purchase, is as derogatory to the honour and respectability of the profession as it is likely to prove injurious to the interests of the poor."

It was moved by Dr. MACRORIE, seconded by Dr. ROBERTSON, and resolved unanimously, "That this meeting, cordially approving of the conduct of the late medical officers of the Aldersgate-Street Dispensary, London, in resigning their offices on the introduction of a law which virtually permits the purchase of medical appointments in that institution, tenders them its thanks for acting upon the honourable and manly principles which guided them on that occasion, and which entitle them to the respect and admiration of every member of the profession."

It was moved by Dr. SCOTT, seconded by Mr. BANNER, and resolved unanimously, "That in the opinion of this meeting, any medical man availing himself of the existence of any law similar to that now complained of, to obtain a public appointment, *is no longer entitled to the respect of the profession.*"

It was moved by Dr. JEFFREYS, seconded by Mr. MURPHY, and resolved unanimously, "That a copy of the foregoing resolutions be forwarded to the late medical officers of the Aldersgate-Street Dispensary, signed by the Chairman on behalf of the meeting."

(Signed) JOHN RUTTER, M.D.,
Chairman.

ADDRESS FROM BIRMINGHAM.

(*From a Correspondent.*)

At a meeting of the medical profession in Birmingham, on the 2nd inst., resolutions were passed relative to the late resignations at the Aldersgate-Street Dispensary, and the following address was agreed to:—

"To Drs. CLUTTERBUCK, BIRKBECK, LAMBE, and ROBERTS; and Messrs. SALMON and COULSON, late medical officers of the Aldersgate-street Dispensary;—

"We, the undersigned physicians and surgeons of the town of Birmingham, beg you to receive the homage of our respect and sympathy for your spirited and independent conduct in resigning your offices

in the General Dispensary, rather than submit to a regulation which you deemed inconsistent with the honour and dignity of the medical profession.

"We cordially agree with you in the principle that such appointments to public charities should be free even from the suspicion of being bought or sold; and we trust that your virtuous example will be emulated by your brethren in every town and county in the empire.

"Accept then the expression of our warmest admiration, entitled as we believe you are to the thanks and approbation of the profession at large."

(Signed by)

Dr. Johnstone; Dr. John Johnstone, F.R.S., *Chairman of the Meeting*; Dr. Booth; Dr. James Johnstone; Dr. Eccles, *Phys. to the Gen. Hospital*; Dr. Davies, *Phys. to the Fever Hosp. and Disp.*; Dr. Lloyd, *Phys. to the Disp.*; Dr. Palmer, Dr. Hamett, Dr. Hucy, Dr. Gibson, Dr. Evans; Mr. Vaux, and Mr. Jukes, *Surgeons to the Genl. Hosp.*; Mr. W. J. Cox, *Lect. on Anat. to the School of Medicine, and Surg. to the Disp.*; Mr. Blount, Mr. Baynham, Mr. Ingleby, Mr. Covey, *Gen. Surgs. to the Disp.*; Mr. Ledsam, *Surg.*; Mr. Middlemore, *Asst. Surg. to the Eye Infirmary*; Mr. Cox, Mr. Bellamy, Mr. Parsons, Mr. Ryland, Mr. Green, *Surg. to the Town Infirmary*; Mr. Wickenden, Mr. Chavasse, Mr. Swinson, Mr. P. Chavasse, Mr. Berry, Mr. W. H. Partridge, Mr. Mainwaring, Mr. G. Taylor, Mr. Bracey, Mr. Porter, Mr. Archer, Mr. Cartwright, Mr. Sanders, Mr. Aaron, Mr. Dickens, Mr. Blunt, Mr. F. Jukes, Mr. J. Taylor, Mr. Chester, Mr. Stubbs, Mr. James, Mr. Welch, Mr. Hammond, Mr. J. Taylor, Mr. Watts, Mr. Heath, Mr. Bindley, Mr. Broomhall, Mr. Freer, Mr. Heeley, Mr. Willcox, Mr. Knowles, Mr. Harris, Mr. L. Parker, Mr. Waddy, Mr. C. Porter, Mr. Hall, Mr. G. Elkington, Mr. Kimberley, Mr. Ellis, Mr. Piper, Mr. Betts, Mr. Palmer, Mr. Elkington, Mr. Hadley, Mr. Pedley, Mr. Grainger, Mr. Crompton, Mr. Parker, Mr. Dufton, Mr. Evans, Mr. Ryley, Mr. Partridge, Mr. Bartleet, Mr. Hudson, and Mr. Gutteridge, *Lect. on Anat. to the Soc. of Arts.*

ADDRESS FROM WIGAN.

"To the Ex-Medical Officers of the General Dispensary, Aldersgate Street, London.

"GENTLEMEN,—We, the undersigned medical practitioners of Wigan, in the county of Lancaster, present our congratulations to you on the admiration already expressed from several quarters, for the conduct you have pursued in resigning your offices, as physicians and surgeons to the General Dispensary in Aldersgate-Street; and *we* now respectfully tender *our* meed of praise for the determination you have evinced (an example worthy of imitation) to uphold the dignity and independence of the profession, to obtain for merit fair opportunities of distinction and reward, and to resist the undue influence of money in the election of medical officers to public charities.

"Whilst we deeply deplore that the efficiency of so valuable an institution as the General Dispensary should be impaired by any collision between the subscribers and the medical officers, we would decidedly depreeate the introduction of such a rule, so unjust in principle and pernicious in tendency, into the government of any public charity, as that which has induced you to resign; and we much regret that *four* individuals should have been found in the medical profession, *so destitute of honour, and so regardless of the opinion of its members*, as to accept the degraded offices you have so nobly abandoned. We have the honour to be, Gentlemen, with great respect, your obedient servants,*

James Stuart, M.D.; Granger Daglish, *Hon. Surg. Wigan Dispensary*; Alexander Shaw, *Surg.*; Thomas Tickle; John Latham, *Hon. Surg. Wigan Dispensary*; Thomas Hawell; Christopher Morris; James Rogerson, *Surg.*; Thomas Fisher, *Surg.*; James Kenworthy, *Surg.*; Jeremiah Lamb, *Surg.*; T. S. Chadwick, *Surg.*; Thomas Rawlinson, *Surg.*; Henry Swift, *Surg.*"

Wigan, November 1st, 1833.

MEDICO-BOTANICAL SOCIETY.—This Society held its first meeting for the season on Tuesday last, when an exposition of the noxious effects of rice on the human system, received a large share of attention from the members. The subject was introduced by Dr. SIGMOND as one of peculiar interest to medical botanists, and elicited a highly-interesting speech from Dr. TYTLER, who was present on the occasion. A report of the proceedings is before us, but we cannot find room for it until next week.

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* Signed by all the medical men in Wigan except two.

LONDON MEDICAL SOCIETY.

Monday, November 4th, 1833.

Mr. KINGDON, President.

THE RESIGNATIONS AT THE ALDERSGATE-STREET DISPENSARY.

WE last week gave, in the shape of the resolutions, the result of the discussion on the above subject at this Society. Less important, but equally interesting portions of the proceedings, in some instances, were the speeches. The exceptions are, of course, those which were not remarkable for novelty of fact and argument. All such exceptions necessity compels us to omit in resuming our notice. This is said without intended disparagement of the oratory. The subject having been worn nearly bare, new views on many points could not be expected. The meeting was a very large one, and the resolutions were carried without a dissentient voice. Four of the ex-medical officers were present, and the entrances of such of them as were observed, called forth warm plaudits from the audience.

Dr. WALLER, after a clear review of the question, proposed the first resolution, which deprecated the seven-day law. The motion was seconded by Dr. WILLIAMS.—Dr. UWINS, in a well-merited eulogium on the conduct of the ex-medical officers, moved that the thanks of the Society should be presented to them. "If this be a nation of shopkeepers in all respects but one," said the worthy Dr., "at least let that one be the medical profession." The resolution was seconded by Mr. DENDY, with the expression of a hope "that the example of the medical officers would not be forgotten." It is time, in fact, that it were already followed. Opportunities abound for its imitation.—Dr. SHEARMAN proposed the vote of thanks to the Duke of Sussex, which Mr. DRYSDALE seconded. —Dr. RYAN moved the grief of the Society that any candidates should have sought to fill the vacated offices. The grief had already been felt at home by the members.—Dr. JOHNSON seconded the resolution in a speech of unflinching severity against the prevalence of nepotic influence in all appointments by which either money or honour is to be acquired in England.—Mr. PROCTOR moved the resolution, seconded by Mr. COX, that the events of to-night be advertised in certain political and medical journals of the metropolis.

At the *Westminster Medical Society*, Dr. Epps stated, on the 26th ult., that Dr. Clutterbuck was consulting physician to the Farringdon and Western Dispensary, in which a money-vote law existed. In reply to this, Mr. WRAY, of Salisbury Square, rose and stated that it was a reflection on Dr. C. which was wholly unjust. Dr. Clutterbuck accepted office in it at the solicitation of Mr. Wray, its originator, and the dispensary is so constituted that whenever a vacancy occurs in any angle of its district, some medical gentleman is appointed to it who resides in the particular quarter which has lost its officer. When all the resolutions had been carried,

Dr. CLUTTERBUCK rose and thanked the Society for the resolution which embodied the names of himself and his colleagues. I have held office in the dispensary longer than Dr. Birkbeck or either of my other colleagues, he observed, and for that reason I address you first. Nothing which emanates from this Society can be indifferent to me, least of all the vote of this evening. I have watched it so long, both in its prosperity, and, if I may so speak, its adversity, that its proceedings are always deeply interesting to me. I have received from it many marks of flattering attention, and have had the gratification of holding more than once its most respected situations. Thus high honours have already been conferred on me, but this new honour is more flattering to me than all the rest. It is for supporting a principle to which the whole profession has subscribed, that I have obtained it—a principle which I have also found supported by the press, both medical and non-medical, at least the respectable portion of that press—and by many governors of the dispensary. Our defeat has been caused by the obstinate and mercenary spirit of certain individuals who have usurped the power of the institution for interested purposes. Such a circumstance it is perhaps beneath the dignity of this Society to notice, but you will estimate their motives when I state that there are seven or eight druggists on the committee, and that those persons constitute a quorum, who have the power to decide by whom the dispensary shall be supplied with drugs and other articles. (The number mentioned by Dr. Clutterbuck was at another period of the evening corrected by Mr. Salmon, who said that there were but three druggists, enough for a quorum, who supplied all the chemicals and medicines, and who could, if occasion required, command the votes of other druggists who had been made life-governors.) These persons (continued the Doctor) order everything that is wanted, examine their own bills, pay them, audit their own accounts, and have the care of all the

money which is subscribed! We can easily understand all this. The system still exists, although considerably more than one hundred gentlemen signed a document, as governors, bearing against it. The inquiry which would have resulted from that step was, however, defeated by the mercenary, not the contemptuous spirit of the committee, for that term does not apply to such a proceeding. New governors were made to oppose it. This we could not meet, and we were therefore outvoted by forty or fifty votes. Another cause of our failure was the readiness with which some individuals of the profession aided the committee, by coming forward to accept the offices we had vacated as places which it was no longer honourable to hold. I am sorry that even one of those individuals should be a member of this Society—one whom I have been accustomed to meet in the most respectable circles of society, and who, even now, is, I believe, not influenced by improper motives in his conduct. I shall still continue to respect him, though I have reason to think that he has mistaken his course, and that he will be the first to feel regret at finding himself placed as he is in the eyes of his professional brethren.—Dr. Clutterbuck then thanked Mr. Wray "for the kind and friendly feeling with which he had referred to another subject," and closed with an expression of thanks to the Society. (*Loud applause.*)

Mr. GROOM, a member of the Dispensary Committee, here rose to defend his colleagues against the charge of "mercenary and interested motives" made by Dr. Clutterbuck, but the PRESIDENT objected to his doing so, saying, that this being strictly a society of medical gentlemen, and he never having, in the whole course of his professional experience, known the chair to be addressed by a non-professional gentleman, he did not feel strong enough to give Mr. Groom the power to do so now. Mr. G. must, therefore, be content with a simple denial of the imputation of "mercenary and interested motives."

Dr. BIRKBECK then addressed the chair in a brief speech, which afforded great satisfaction to the members. Alluding to the spirit of medical reform which had ever actuated him, he alluded with much humour to the fact, that years since he and Dr. Clutterbuck had stood before the Society as innovators on bad customs, having been the first to tear from the chair of the Society the nearly immoveable Dr. Sims, who lorded the members in high style, and stood (or rather sat) resolutely in the way of all improvement, and wholly impeded the progress of science in the institution. Great was the strength of Sims, but his tower fell beneath the assault of his assailants. So obstinately, indeed, had he fixed himself in the seat, that but for the opposition then made, he would, had death spared him, doubtless at that very moment, have been sitting in the chair, the leather of which was so thoroughly identified with the nether integuments of the Doctor, that they had almost become united by the process of vital adhesion. Most reluctantly was he dragged therefrom. Some such a task had he, Dr. B., and his respected colleague had at the Aldersgate-Street Dispensary. The profession, however, must no longer insult and vilify itself, but become its own protector. Let the profession but see how the medical officers of the dispensary had been treated by the Committee. After having been the servants of the Committee (such the Committee strove to make them) for years, and one of them (Dr. Clutterbuck) for a longer period than could be instanced in any other medical charity in London, to what a fate had they come! Medical men were not only required to labour professionally for such institutions, but from them also was the money required to pay the expenses! Nepotism was said to be too general in this country. Then why open a fresh door for it? Family influence was said to be barely tolerable, but unavoidable! Then why add to it the avoidable but intolerable one of gold? A great and most important principle was now at work, an amazing purification of the profession had been commenced, and while he thanked the Society for its favourable feeling towards him, and the construction it had put on all their motives, he was yet more gratified at its detestation of the principle now condemned. He trusted the members would no longer keep peace with a system which had been destroying the profession, and ever taking from industry and talent its highest reward. (*Great applause.*)

Mr. SALMON next returned thanks, and in doing so declared his opinion that the four persons who now held situations in the dispensary, did so illegally. They were announced to the governors by the medical committee as "eligible candidates;" but by whom, and in what manner? He, Mr. Salmon, met one of the judges of eligibility the other day, when the latter said, "I have been looking over the testimonials of Mr. or Dr. so and so, I hope I have done no harm?" "Why, you were no governor of the charity?" "No, I never paid a farthing myself, but somebody did so for me, in order that I might be qualified to examine the qualifications."

Thus did the Committee obtain testimonials of the eligibility of the candidates, whose elections he was therefore convinced was illegal. And with money in the funds had they thus acted,—crying out that they did so act from want of more cash!—Mr. Salmon then observed, in reply to some statement, that the resignation of the Duke of Sussex was sent in wholly without communication between the Duke and the medical officers, and concluded by returning his thanks for the vote.

Mr. COULSON next addressed the Society, in a brief and appropriate speech, expressing his warm thanks for the mark of approbation passed in his favour.

Thanks were next voted to the President, and the meeting separated.

THE LANCET.

London, Saturday, November 16, 1833.

ARE the people who manage affairs at Rhubarb Hall *lunatics?* Are they stark *mad?* Surely something has unwitted them, or they would not be running headlong to accomplish their own ruin! After the late discussions in Parliament, after the indignation which the conduct of the Worshipful Company has excited amongst the graduates of our Universities, we might have expected some show of *discretion*, if not of honesty. That the members of the Worshipful Company are unconscious of what were the intentions of the Legislature in passing the Act of 1815, few will be disposed to credit; yet the proceedings of Rhubarb Hall would induce a belief that the statute in question was designed to secure a fraudulent and unblushing monopoly in favour of a body of men, who, of all other individuals belonging to the profession, were the least entitled to legislative favour or protection. Cannot the Worshipful Company pause in its iniquitous course? Is there to be no restraint on its tyranny? No check on the control of its ill-acquired authority? When we state that the Society of Apothecaries is continuing to direct its prosecution against *qualified* medical practitioners, against graduates of the University of Edinburgh, against members of the Irish College of Surgeons, against licentiates of the Irish Company of Apothecaries, against members of the Royal College of Surgeons of London, our readers will not be surprised on finding that the foregoing questions are propounded.

While, however, these outrageous attacks of the Company, these furious assaults, are continued against gentlemen who are authorised to *prescribe* for the relief of the sick, the Worshipful Company directs no portion of its rage against the unprincipled pretenders, the impostors, the quacks, who infest almost every street and alley of the metropolis. The Worshipful Company, adopting the cant of ordinary hypocrites, professes to excercise its functions for the benefit of those very parties whom it invariably selects for the infliction of its injuries. But in its search after victims, considerable sagacity is displayed with respect to the immediate profits of the pursuit. The *qualified* practitioner, doubtless, is presumed to be a man of *means*,—to be able to command wherewithal to discharge the fine, and pay the frightful bill of costs presented by the experienced hand of the thrifty EDMUND BACOT. The quack, being a migratory animal, is not so easily pursued, and, when caught, often proves to be a profitless prize.

If we regarded merely the success of that great general question which is at stake in the struggle for medical reform, we should rejoice, most unequivocally, in the continued prosecution, by the Company, of the graduates of our Universities, and of other legally-qualified practitioners in medicine. But when we reflect on the miseries which the cruel proceedings of

the Company produce in many families,—when we observe that respectable men are compelled to depart suddenly from towns in which they have for years maintained an unsullied character and reputation, we are at a loss for words to express our contempt, our abhorrence, of the conduct of a Society, whose prosecutions, if they be not decidedly malignant, certainly are typical of the most unamiable of human feelings.

When the Parliamentary Committee is set in motion, we will take especial care that evidence of prosecution, by the Worshipful Company, of qualified practitioners, shall be laid before that committee. At the same time, a full and clear exposition of the conduct of the Company, or, rather, its non-interference with acknowleged quacks and medical druggists, shall be produced for the information and guidance of Mr. WARBURTON and his coadjutors. If the Apothecaries Company think proper to contend that the druggist is screened by the 28th section of the Act of 1815, why not, even in that case, push the question to an issue, in order that, if the law be really defective, it may be altered so as to suit the exigency of the times, and afford a really salutary protection to the public? Influenced by the narrowest views of social and medical polity, unaccustomed to the consideration of the science and practice of medicine, except in connexion with trade and profit,—the Society has proved that it is utterly incapable of fulfilling, even in a remote degree, the intentions which actuated the Legislature in passing the Apothecaries Act.

That a certain extent of benefit has resulted from this measure is sufficiently obvious, but the advantages cannot be traced to the execution of the law by the Worshipful Company. The mere existence of the Parliamentary statute has exercised a strong influence on the minds of medical students, and a mere knowledge of the *necessity* of undergoing an examination in pharmacy, has been productive of a beneficial effect in stimulating the youthful mind to be prepared to reply to questions which *might* be proposed, when subjected to the process of interrogation. Although the range of questions may be exceedingly limited, the candidate for the license has no means of pre-ascertaining on what subjects even trifling queries may fall. Hence, he feels it to be necessary to prepare himself on all the subjects that *may* be scrutinised, in order to reply to the few questions that the Court of Examiners may propose. Besides, as was truly remarked by JOHNSON, "fools may ask questions which even wise men cannot answer."

We conclude this notice, then, by exhorting our professional brethren in every part of the kingdom, not to neglect collecting, materials to lay before the Parliamentary Committee. We beseech them, as they value the respectability of the profession to exercise their individual influence with members of Parliament in explaining the anomalous and scandalous condition of our medical laws, to point out the medical abuses which have been so repeatedly exposed in the pages of this Journal, and to enforce the necessity of re-constructing, upon an entirely new basis, the legislative details of our medical constitution.

SIR WILLIAM BLIZARD, at the age of nearly one hundred years, has tendered his resignation as surgeon of the London Hospital. We suppose that, at such an advanced age, he will also consider it his duty to retire from the Court of Examiners in the College of Surgeons. With SIR WILLIAM we have been compelled, from the first commencement of this Journal, to wage a severe and uncompromising war; and it is possible that at times we have not made sufficient allowance for the

prejudices which he necessarily imbibed in early life, and for the feelings which were engendered by the Tory system of exclusion which enabled *him* to thrive, and which he was, consequently, instructed to admire. We now, however, present the venerable centenarian with a flag of truce—an emblem which we shall not again withdraw—so far as he is concerned,—and most cordially do we hope that the remainder of his life may prove one undisturbed scene of tranquillity and enjoyment.

An inquiry has been instituted before the Middlesex magistrates with respect to the alleged refusal of the medical superintendent of the County Lunatic Asylum, at Hanwell, to admit a patient under an order from the magistrates at Hatton-Garden. The investigation appears to be a very proper one; but as the case is still *sub judice*, we shall offer no statement at present on the allegations of either party.

The letter of Mr. Barnett, inserted below, furnishes a striking illustration of the views of Dr. Tytler with respect to the deleterious properties of some descriptions of rice. Although the circumstances related by Mr. Barnett appear, in this quarter of the globe, to be so extraordinary, yet hundreds of instances of fatal results arising from the employment, as food, of poisonous rice, may be found in the pages of the interesting pamphlet just published by Dr. Tytler, entitled, "Facts, establishing the Deleterious Properties of Rice, used as an article of Food."*

RECENT DEATHS AT LIMEHOUSE FROM EATING RICE, AND UNSOUND BARLEY. —CASES OF MALIGNANT CHOLERA.

To the Editor of The Lancet.

Sir,—Since the announcement of Dr. Tytler's opinions relative to the deleterious effects of rice, and of its capability of producing malignant cholera, I have watched very closely all the cases which have come under my notice, to ascertain whether that article was concerned in its production; but in no instance could I trace the least sign of rice entering into the articles of diet, at any reasonable time prior to the attack, until Sunday last. In one instance, however, which occurred on board a Finland ship, the entire crew were seized with diarrhœa, and three of them (including the captain) passed into the stage of collapse, only one of the sailors recovering,—the barley, which constituted a large share of their diet, having very little appearance of the mealy portion; and on comparing it with that on board the next ship, it proved to be considerably darker, and evidently a much inferior article. I must confess that I am not favourable to the opinion that rice is the cause of malignant cholera, but as Dr. Tytler solicits facts, and not opinions, I will relate a case which took place last week. On Sunday morning last I was sent for to visit a woman, named Weldon, residing in Nightingale-lane, Limehouse, whom I found labouring under a most severe attack of malignant cholera, and involuntarily passing the rice-water dejections in bed. Upon inquiry she informed me that she had bought some rice at the corner of Osborne-street, opposite Whitechapel-church, for which she paid at the rate of three-pence per pound; on Tuesday she boiled some, and ate it for her dinner, with sugar and butter. She also took a part in a saucer to her grandchild, who only ate a small quantity, her own daughter eating the remainder. On Wednesday she became very much relaxed in her bowels, and continued so until Sunday, when, about five o'clock in the morning, she passed a large quantity of clear water from the intestines, which made her faint; and from that time she had been in the state she exhibited when I saw her. The grandchild was seized early on Wednesday morning with sickness and purging; her own daughter was also attacked with diarrhœa on the Wednesday, which continued two days.

The whole of the rice not being used, I procured a small quantity of it, which I send you for Dr. Tytler's inspection, unless he should think this solitary instance too insignificant for notice.—I am, Sir,

Yours obediently,

T. W. Barnett.

Limehouse, Nov. 13th, 1833.

P. S. The woman, Weldon, died this morning.

*** The sample of rice has been forwarded to Dr. Tytler.—Ed. L.

* Published by Renshaw and Rush, Strand, London.

PROCESS OF DEFECATION.—LETTER FROM MR. SALMON.

To the Editor of THE LANCET.

SIR,—I beg to state, in answer to Mr. Oldknow of Nottingham, that immediately upon the appearance of Dr. O'Beirne's remarks in reply to my observations on the editorial review of the *London Medical and Surgical Journal*, I wrote to Dr. Blundell of Great George-street, and Mr. Bransby Cooper, requesting they would inspect my preparations of the diseases of the rectum, and favour the profession with their report. From particular arrangements on the part of Dr. Blundell, their decision has not yet been received by me. I have, however, reason to know, that it will shortly appear, and I trust *fully* set at rest the important practical fact to which your correspondent's letter most especially refers. Requesting your insertion of this note, I am, Sir, your very obedient servant,

FREDERICK SALMON.

12, Old Broad-street, Nov. 12, 1833.

NEW CANDIDATE FOR NOTORIETY.

To the Editor of THE LANCET.

SIR,—I send you the card of a fifth candidate for notoriety:—

"DR. ROWLEY

"*Solicits your Vote and Interest in his favour, as a Candidate for the Appointment of Physician to the General Dispensary, Aldersgate-Street.*

"*** THE DAY OF ELECTION IS FIXED FOR NOVEMBER 15TH."

This candidate waited on me for my vote. I briefly replied, that I was sorry to see him thus opposed to his professional brethren. He blushed and departed.

Your obedient servant,

A GOVERNOR.

Nov. 13th.

REPLY TO A QUERY.—"*R.*", to whom we put a question at page 263 of our last number, has favoured us with the following reply:—"I have not seen the tumour but I have been given to understand by Mr. Scott, that the diseased mass was composed partly of medullary sarcoma (diffused) partly carcinomatous, and that parts also bore the characters of what is generally denominated "common scrofulous disease."

CIRCULAR FROM THE COLLEGE OF SURGEONS.

To the Editor of THE LANCET.

College of Surgeons,
November 8th, 1833.

SIR,—By desire of the President I transmit to you the enclosed copy of a circular to the Lectures recognised by this College.—I am, Sir,

Your most obedient servant,

EDM. BELFOUR, Sec.

[Circular.]

"Royal College of Surgeons in London,
31st October, 1833.

"SIR,—I am directed by the Court of Examiners to acquaint you that certificates of attendance on lectures have been offered to the Court, in order to entitle the candidates to examination for the diploma of this college, which certificates the Court are fully satisfied were obtained under false pretences.

"I am further directed to request you will inform the students composing your class, of the extreme dissatisfaction and regret with which the Court have made this discovery, and that you will assure them the Court will in future punish, with the utmost severity the law admits, all persons who may be implicated in a similar offence.—I am, Sir,

"Your most obedient,

"Humble servant,

"SECRETARY."

CORRESPONDENTS.

Amicus.—The subject is under consideration, but the vulgar names in use are so different in different parts even of this country, that it will be for the most part impracticable to act on the suggestion. The difficulties of the general reader will necessarily decrease as the scale of organization is ascended.

The admissions or denials of an anonymous writer cannot have the least value, and with these, half the letter of *W. S.* is occupied. Moreover, if the answers to many of his questions are so obvious, there can be no occasion to print them. Dr. T. defends no monopoly. He states a fact. He would not, we are sure, attempt to remove the evil by reinstituting the monopoly. W. S. does not understand the Doctor's views. Let us have facts on this subject. To arguments there would be no end.

The communication of *Mr. Furley* came too late to be noticed farther this week.

G.—The linen-draper doctor is not worth half a yard of his father's calico. Should he become troublesome, we shall know how to dispose of him.

The letter of *Z. Z.* has been forwarded to our reporter. It is quite clear that there must be some mistake.

The letter of *Veritas* came too late for this week's Number.

ERRATUM.—No. 531, leader, in page 222, line 22, *for* we have *read* he has.